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OF THE

Field Naturalists' Club of Victoria.

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The Author of each Article is responsible for the facts and opinions recorded.

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ERRATUM.

Page 68, line 34—For "*Zeurera*" read "*Zeuzera*.."

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 15th April, 1901. Mr. T. S. Hall, M.A. (one of the vice-presidents), occupied the chair, and about 40 members and visitors were present.

REPORTS.

A report of the Club's visit to the Zoological Gardens on Saturday, 23rd March, was read by Mr. D. Le Souëf, C.M.Z.S., who acted as leader on the occasion. Much interest was taken in the Scrub Turkeys, and a number of young birds of various ages hatched out this season were seen; also some young Brown Quail only a few days old, which looked like mice running about. Among recent additions noticed was a Malayan Tapir.

An account of the Club's visit to the Geological Department at the University on Saturday, 13th April, was given by Mr. F. G. A. Barnard, who said that an interesting afternoon had been spent. Prof. Gregory demonstrated the different methods of taking the specific gravity of minerals, the cutting of rock sections, &c., and then pointed out the arrangement of the collection, and called attention to some of the more noteworthy specimens.

The hon. librarian acknowledged the receipt of the following donations to the library :—"Handbook of Destructive Insects of Victoria," part 3, by C. French, F.L.S., Government Entomologist, from the Department of Agriculture, Victoria; "Handbook for Melbourne Meeting, Australasian Association," 1900; "Records of Australian Museum," vol. iv., No. 1, from the Trustees, Sydney; "Queensland Flora," part 3, by F. M. Bailey, Government Botanist, Brisbane, from the author; "Proceedings Royal Geographical Society of Australasia, Victorian Branch," vol. xviii., part 2, 1900, from the Society; "Guide to the Western Australian Museum, Perth," from the Director; *Nature Notes*, March, 1901, from the Selborne Society; *Science Gossip*, March, and *Knowledge*, March, from the proprietors; and "Nests and Eggs of Australian Birds," by A. J. Campbell (purchased).

ELECTION OF MEMBERS.

On a ballot being taken, Mr. G. B. Pritchard, Mantell-street, Moonee Ponds, was duly elected a member, and Mr. Jos. A. Hill, Kewell, a country member.

GENERAL BUSINESS.

Mr. F. Wisewould drew attention to the approach of the 21st anniversary of the formation of the Club, and after some discussion, in which Messrs. Barnard, Tisdall, Sayce, and others joined, moved—"That some form of reunion be held to celebrate the 21st anniversary of the Club's foundation." This was seconded by Mr. H. T. Tisdall, and carried.

PAPERS READ.

1. By Mr. R. Hall, entitled "Descriptions of Young of Some Australian Birds."

The author described young forms of the Mallee Hen, Wonga Pigeon, White-faced Ternlet, Winking Owl, Boobook Owl, Owlet Nightjar, Spotted Pardalote, Horsfield's Bush-Lark, Wattle-cheeked Honey-eater, White-shafted Fantail, and the Grass-bird, and exhibited specimens of some of them.

2. By Mr. T. S. Hall, M.A., entitled "On Certain Incrustations in Dune Sand."

The author quoted various opinions as to the formation of these curious structures, so common in the sandhills of the southern coast, and gave his own conclusions about their origin, exhibiting specimens in illustration of his remarks.

The paper gave rise to considerable discussion, in which Messrs. Le Souëf, Barnard, Campbell, Sayce, and Shepherd joined.

NATURAL HISTORY NOTES.

Mr. H. T. Tisdall called attention to a malformed lemon exhibited, which he said was one of many similarly shaped.

Mr. A. J. Campbell read a note from Mr. H. Kennon, recording the occurrence of a pair of Pied Oyster-catchers at Auburn.

EXHIBITS.

By Mr. A. Coles.—Pair of Green Goose-Teal, *Nettopus pulchellus*, from Daly River, Northern Territory.

By Mr. C. French, jun.—Destructive Longicorn Beetles, *Uracanthus triangularis*, breeding in *Hakea nodosa*, a new food plant for this insect, from Oakleigh.

By Messrs. Fulton and Grant.—*Bergus latro*, Leach, or Cocoanut Robber Crab, Pacific Islands.

By Mr. R. Hall.—Specimens in illustration of his paper.

By Mr. T. S. Hall, M.A.—Specimens and photographs in illustration of his paper.

By Mr. G. E. Shepherd.—Eggs of Short-tailed Petrel (Muttonbird), collected at Cape Wollomai; Black-throated Grebe and Australian Goshawk, taken at Somerville.

By Mr. F. Spry.—Trilobite (n. sp.), *Cyphaspis spryi*, Gregory, from Yarra improvements; Encrinurus (sp.) and Homalonotus

(sp.), from Domain-road sewer and Yarra improvements; also Dyke Rocks, from sewer, Flinders-street and Jolimont.

By Mr. E. H. Swan.—Curious malformation of a lemon grown in the Dandenong Ranges.

After the usual conversazione the meeting terminated.

AMONG THE WATERFOWL IN RIVERINA.

By D. Le Souëf, C.M.Z.S.

(*Read before the Field Naturalists' Club of Victoria*, 11*th Feb.*, 1901.)

In December last I was enabled, in company with another member, Dr. C. Ryan, to visit some of the swamps in the Riverina district of New South Wales, situated not far from the River Murray, and, although late in the season, we were fortunate in finding many waterfowl nesting, but most of the nests had young birds in. The most interesting sight was a small colony of the following birds :—Black Cormorants, *Phalacrocorax carbo*, Little Black Cormorants, *P. sulcirostris*, Nankeen Herons, *Nycticorax caledonicus*, Plumed Egret, *Mesophoyx plumifera*, White Egret, *Herodias timoriensis*, Yellow-billed Spoonbill, *Platibis flavipes*, White Ibis, *Ibis molucca*, Straw-necked Ibis, *Carphibis spinicollis*, and a single nest of the Wedge-tailed Eagle, *Aquila audax*, from which the young had flown. All these birds were nesting together over the space of about an acre, and it was an exceedingly interesting sight, and shows how the large majority of birds prefer building in company, hawks included, even to the little Yellow-rumped Tit, *Acanthiza chrysorrhoa*, which often builds in the lower portion of the nest of the Wedge-tailed Eagle, probably in most cases for self-protection. The site of the rookery was not far from the River Murray, on swampy land on which tall, smooth-barked red gum trees grew thickly, and it was in the slender upper branches of these trees that the birds nested, which consequently, in most cases, made it impossible to get at them. Much dead wood lay on the ground, and a few aquatic plants grew in the damper places or in the water, but no grass. The locality had a strong fishy perfume, from the excreta and the remains of dead fish, small crayfish, &c.

The Little Black and the Pied Cormorants were, as is usually the case in these colonies, by far the most numerous, and they built their nests close together, often getting as many as possible in one tree. Some were built over 100 feet from the ground, but they seem to prefer nesting on low trees if they are to be obtained, and occasionally on the dead timber lying on the ground. The two kinds have their nests together; it is practically impossible to distinguish one from the other, or the eggs either. The nests are large, with very little depression in the centre.

The ordinary clutch is four elongated white eggs, which are unevenly covered with lime. The young are fed with partially digested food, the little ones putting their beaks well into the throat of the parent bird to receive it, the old bird seeming to jerk the food up. On losing the down the young of the Pied have only a comparatively small patch of white on the breast and do not get their full plumage until the third year. When disturbed they frequently climb out of their nests on to the higher branches, and, to help themselves up, frequently insert their head or neck into a fork above them, but occasionally the fork is narrow, and the bird, being unable to extricate itself, gets hung. But many of the young just tumble over the edge of the nest on to the ground below, the concussion frequently killing them if the soil is hard ; but if they fall in the water they at once dive, and, keeping their body under water, put up their head through some vegetation or alongside some fallen brushwood or timber, and try to escape notice by remaining perfectly still, and they frequently succeed.

The Black Cormorant is not nearly so numerous, and they build on the highest and most inaccessible branches they can find, and not necessarily close together like the smaller kinds. Nankeen Herons were also plentiful, and their nests, which were situated high up on very slender branches, were rather bulky structures and composed of twigs and well lined with eucalyptus leaves, green twigs with the leaves attached being often used in building. Many broken egg-shells from which the young had been hatched were lying on the ground. The clutch consists of three very light blue eggs, but when they are first laid they are of a light green colour, but soon turn to the delicate blue shade. My brothers in Western Australia, in mentioning about a rookery of these birds that they visited on one of the islands, state that they nested there under bushes or ledges of rock, many making practically no nest except a few twigs, and again others only half a nest, if the site was situated on sloping ground, to prevent the egg rolling down hill, but they also found some beautifully constructed nests in the caves and sides of the cliff, where they looked very picturesque against the filigree rockwork as a background. The eggs varied a good deal in shape and size.

The principal item of the food of the Riverina birds seemed to consist of small crayfish or yabbies, and remains of these crustaceans were plentiful beneath the trees on which their nests were. In every case I noticed it was the male bird sitting on the nest, and not the female—she was either away hunting for food or sitting on a branch close by, and on one occasion I observed her feeding the male as he sat on the nest, but do not know if they do it regularly or not. The young were mostly very small at the time of our visit.

White Egrets were not plentiful, as over one hundred of these birds had been shot at this breeding-ground some years previously. They built bulky stick nests lined with leaves high up in the eucalyptus trees, but in thicker branches than the Nankeen Herons. All the nests had well advanced young in, and it was a beautiful sight to see these stately birds standing on their nests, with three well-fledged young in, the dark background of eucalyptus foliage making their snowy white plumage stand out with great effect.

When the parent bird flew on to the nest with food, uttering her discordant note in doing so, the young stretched out their long necks, and, opening their beaks expectantly, vigorously waved their heads from side to side, squeaking to the best of their ability as they did so, and as most of the different young in the rookery were doing the same more or less whenever they saw an adult bird near them, the air was full of their various cries, both from adult and young. Both parent birds feed the young, but not always in turn. The eggs are of a delicate blue colour, four being the full clutch. They vary considerably in size. These birds are unfortunately much sought after for the sake of their plumes, and, as before mentioned, many were cruelly destroyed in this rookery during the nesting season for the sake of the few feathers to be obtained from them, and the young were left to perish, showing what cruelty some men can inflict for the sake of a small monetary gain. These Egrets are the most beautiful and graceful birds of their kind we have in Australia. One nest of the Plumed Egret was observed situated high up on a thin bough, with one of the birds sitting on and the other standing close by.

Several Yellow-billed Spoonbills had their nests on the outskirts. They were not much more than a platform of sticks resting on a thick horizontal bough or fork and lined with a few leaves. They also had young, and three is the ordinary clutch, although occasionally four are noticed. Their eggs are pure white. These birds are nowhere very plentiful in southern Australia. Their white plumage makes them very conspicuous.

Strange to say, a few of the Straw-necked and White Ibis were here. They had probably missed their usual nesting-place, so did so here, and as the lignum and other low bushes they generally build on did not grow here, they built well up in the trees instead, on a thick horizontal bough if possible, and their young evidently have to stay in the nest until they can fly. Ibis always prefer nesting with their own company, but occasionally then single pairs of birds are unable to find the nesting colony, and perforce have to build elsewhere, in company with other birds if possible, but occasionally a pair will be found nesting entirely

alone, either of the Straw-necked or White, but it does not often occur.

We were able to visit a lake not far from this locality, and were fortunate in finding several waterfowl nesting. The lake itself was well fringed with red gum trees, and in the shallower water near the edge various water weeds grew in profusion, as well as patches of bulrushes, and these rushes in many places also lined the banks. We found many nests of the Tippet Grebe, *Podicipes cristatus*, and it gave us great pleasure watching these birds as they disported themselves on the clear water or hunted for their insect food among the weeds. Their floating nests were of considerable size, about 9 inches in diameter on the surface and 7 inches in depth, and were composed entirely of green water weeds, and floated low in the water. They were generally situated among the bulrushes, probably to escape observation. The eggs were very little above the level of the water, and, of course, were always wet. The birds almost invariably covered up the eggs with the weed before leaving, but if disturbed suddenly when sitting they have not time, so leave them uncovered, but that seldom occurred. They also leave their eggs for a considerable time during the heat of the day, often for hours, letting the sun keep the eggs warm for them, and also the internal heat of the mass of weeds that compose the structure helps considerably in the incubation, and the eggs being covered up both keeps the bottom heat in and prevents the sun from scorching the eggs. Some of the water weeds growing in these swamps seem to have the property of discolouring and staining. For instance, when wading about among them where they grew thickly our toe nails were all stained a deep bluish-black, and it was with considerable difficulty that it could be erased. The eggs of the Grebe also apparently get stained in the same way. They are white when first laid, but in a day or two get a dirty-looking brown. Some weeds stain much darker than others, consequently in some cases the eggs will be irregularly stained light brown and in other cases very dark. Three eggs in the ordinary clutch, although four, and occasionally five, are met with. The little ones leave the nest as soon as hatched, but often seem to rest on it during the night, treading it quite flat, and also drawing the weeds of which the nest is composed well out into the water on one side, which forms a kind of platform, and the birds evidently get on and leave the nest on that side.

Several nests of the Australian Coot, *Fulica australis*, were found. Some were partly floating and partly resting on the bulrushes among which they were built; others again were situated at water level among the branches of fallen timber or by the stump or root of a tree. Those built among the bulrushes in the deeper water were mostly composed of that material, with a few

twigs and bunches of eucalyptus leaves added, and occasionally some of the rushes just about the nest would be broken down and bent over. Those built in the shallower water near the bank, and away from the rushes, were composed almost entirely of twigs and leaves. One floating nest was noticed which was composed entirely of water weed, the eggs being about 4 inches above the level of the water; it was away from any rushes or other shelter. The number of eggs in the different nests varied from five to nine.

Several Musk Ducks, *Biziura lobata*, were seen, either diving for their food in the deeper water or searching for crustacea and other insects among the water weeds nearer the bank. They nested either on the shore in hollow logs and similar places, or among the bulrushes over the water. These they bent down where they were thick and matted them together at the water level, sometimes adding a few more. These nests were very rough, loose structures, with practically no lining, a portion of the lower part being immersed in the water. The eggs are of a very pale green colour, and frequently show scratches on, apparently from the feet of the bird, showing that the outer coating of green is soft when the egg is first laid.

Other species of birds were seen, but they had evidently finished nesting, such as Black Moorhens, *Gallinula tenebrosa*, Marsh Terns, *Hydrochelidon hybrida*, &c. Our visit to the lake was a most fascinating and interesting one, and we could sit for hours with a strong pair of field glasses watching the antics of the various birds as they disported themselves on the water. Black Swans, *Cygnus atratus*, had their floating nests among the reeds and rushes, and in their immediate neighborhood they had pulled off the greater portion of the tops of those plants wherewith to construct their nests, and these were very bulky structures and maintained my weight when I scrambled on to one.

Bee-eaters, *Merops ornatus*, were noticed on the sandy rises in which they nested. These birds lay about five eggs, one every other day, consequently, as they are hatched in the order in which they are laid, the oldest bird will be about ten days old when the youngest is hatched. The illustration here shows a nestful of young birds and a heavily incubated egg from one nest, and it will be noticed that they are all in different stages—the oldest nearly fledged and the youngest in down. The burrow the parent birds make is about 2 feet in depth, in a slanting direction, with a small chamber at the end, but no nest is made, the pure white and nearly round eggs being laid on the sand. Their food consists largely of beetles, and the floor of the nest is generally plentifully bestrewn with the wing-cases of these insects.

[The paper was illustrated by a series of lantern slides.—Ed. *Victorian Naturalist.*]

A NATURALIST IN THE MALLEE.

By C. French, jun.

(*Read before the Field Naturalists' Club of Victoria*, 11*th Feb.*, 1901.)

The district known as the Mallee occupies the north-western corner of Victoria, and may be briefly defined as having South Australia and the River Murray for its western and northern boundaries, while an imaginary line drawn from Swan Hill through Donald and Dimboola to Serviceton will give roughly its eastern and southern limits. This area of some 18,000 square miles, which was formerly regarded as uninhabitable, and in great part desert, has gradually been penetrated from various directions by pioneer settlers, who have found many portions suitable for wheat-growing, and have been followed by the necessary railways for conveying their produce to market. Thus no less than six lines of railway now enter this area at different points. From this it will be seen that though to some extent possessing a fauna and flora peculiarly its own, sufficient difference of soil exists to give considerable variety to the natural history of the Mallee.

Having arranged to spend a brief holiday in the district for the purpose of collecting such natural history specimens as might prove of interest, we decided to make Hopetoun, about 250 miles north-west of Melbourne, our starting point. From thence we went westerly some twenty-five miles to Lake Albacutya, thence northerly to Lake Bambrook, and back to Hopetoun *viâ* Pine Plains.

Soon after passing Murtoa typical specimens of the Mallee flora, such as Swainsonias, Helipterums, and Helichrysums begin to appear. At Hopetoun the first plants to attract one's attention are the common everlastings *Helipterum corymbiflorum* and *Helichrysum obtusifolium*, the former extending probably for hundreds of miles, its white flowers making the plains look as if a snowstorm had recently taken place. It is singular that these plants are not used for florists' work, especially for funeral wreaths, as the flowers last for a considerable time and do not fall to pieces so easily as many other everlastings.

Lake Albacutya, distant from Hopetoun about twenty-five miles, was selected as our first collecting ground. On the way sandy Mallee country was passed, the whole of it a huge flower garden. The beautiful large blue-flowered Aster, *A. exul*, grows everywhere, and as we proceeded further such plants as *Loudonia behrii*, resembling *Stackhousia linarifolia*, *Lasiopetalum behrii*, a shrub belonging to the Sterculiaceæ, *Erysimum blennodioides*, a cruciferous plant with pink and white flowers, and the small yellow-flowered *Helipterum jesseni* were noticed. Nearing Lake Albacutya the Mallee eucalypt, *Eucalyptus gracilis*, was noticed in flower, while the White-plumed Honey-eater, *Ptilotis penicillata*,

and the Graceful Honey-eater, *P. ornata*, were to be seen feeding on the nectar. The colour of the former bird is much lighter than the specimens usually met with in the vicinity of Melbourne.

Arrived at Lake Albacutya we decided to spend a few days collecting in the vicinity. The "Native Hollyhock," *Lavatera plebeja*, grows here abundantly, and on account of its tall spikes of beautiful bluish flowers should be introduced into our gardens. On the sandhills near the lake some very fine specimens of *Cassia sturtii*, a shrub with beautiful yellow flowers, were found, and on the leaves of the introduced Flat Weed, *Hypochœris glabra*, was noticed a fungus, *Puccinia hieracii*, which according to Mr. D. M'Alpine, the Government Vegetable Pathologist, is new for Victoria. This fungus attacks the young plants only, covering the leaves with small black shining spots, each nearly the size of a pin's head. Another fungus, *Septoria tabacina*, M'Alpine, was also found attacking the Native Tobacco, *Nicotiana suaveolens*, and has been described by Mr. M'Alpine in the *Victorian Naturalist*, vol. xvi., p. 141.

Lake Albacutya is a fine sheet of water, having an area of about twenty square miles, but presents a peculiar appearance owing to the great number of small dead trees standing in the northern end of the lake. This fact would tend to show that at no very distant period the lake must have been dry, and that for some years. The Little and the Little Black Cormorants had just finished building their nests in these dead trees, but the nests were as yet without eggs. The only aquatic plants growing in the lake were *Azolla filiculoides* and a species of Nitella. On the edges of the lake grew large patches of *Chenopodium atriplicinum*, which is regarded as a splendid fodder plant in these parts. Australian Coots and Black Swans were seen in dozens, swimming on the lake, also the Australian Tippet Grebe, the Pelican, and several species of ducks, but as the latter were some distance from us we had difficulty in identifying the species with certainty. The Black-fronted Dottrels, *Ægialitis melanops*, were everywhere to be seen running along the edge of the water, and though a diligent search was made for their eggs we were unsuccessful. This Dottrel, as is well known to oologists, has the habit, as a protection to her eggs, of smearing them over with mud, which makes their discovery exceedingly difficult.

From Lake Albacutya we went to Lake Bambrook, a much better collecting ground for the naturalist. Birds, plants, and other specimens of natural history were here in profusion. Among the commoner plants were *Heliotropium curassavicum*, *Styphelia cordifolia*, a tall-growing species with small flowers; *Boronia cœrulescens*, bearing blue and white flowers, and many others. As in Lake Albacutya the only water plants growing here were Lemna and Nitella. That noble-looking bird, the White-bellied

Sea Eagle, *Haliaëtus leucogaster*, was observed hovering over the tops of the tall Red Gum trees, *Eucalyptus rostrata*, and after a search its nest, a huge structure, was discovered. Fully a couple of cartloads of material must have been used in its construction. It was composed of dried sticks, was lined with dried eucalyptus leaves, and was ready for eggs, while close by was a nest of the White-fronted Heron containing two young birds.

Insects were exceedingly scarce, owing to the exceptionally dry season. The beetles captured were *Bolbaceras sloanei* (being new for Victoria), *Scaraphites assimilis*, *S. hirtipes*, *Epilectus fortis*, *Neocarenum elongatum*, *Carenum anthracinum*, *C. gracile*, *C. cordipenne*. *C. scaritioides*, *Euryscaphus minor*, *Hypharpax deyrollei*, *H. interioris*, *Dromius crudelis*, *Clivina melanopyga*, *Chlœnius australis*, *Leptopodus iridipennis*, and *Sarticus obesula*. At night many specimens of "Frog Hoppers," Membracidæ, representing a fair number of species, were attracted by the light. By placing a piece of newspaper on the ground they would alight on it, and were then captured. These specimens have been forwarded for naming to Dr. Goding, a specialist, who is at present engaged on a work on the Membracidæ of Australia. Lepidoptera right through the Mallee were conspicuous by their absence, though now and again a straggling specimen of *Heliothris armigera*, one of the most destructive of moths, was met with, and was the commonest species seen by us. Probably later in the year this part of the country would yield some rare species.

Amongst the red gum trees bordering on these Mallee lakes is the home of the parrots, parrakeets, and cockatoos. The first species generally met with is the Ring-necked or Barnard's Parrakeet, *Barnardius barnardi*, which is the commonest. The adult male is a very handsome bird, the combination of green, blue, yellow, and crimson being very striking. The Rose Hill Parrakeet, *Platycercus eximius*, is rather rare in these parts, only a couple of specimens being noticed. The Black-tailed Parrakeet, *Polytelis melanura*, which is also known as the "Rock Pebbler"—though how it obtained this name I cannot imagine, for where these handsome birds abound there are no rocks whatever, and no pebbles, the nearest being over a hundred miles away—is only found in the timber bordering on the lakes. Other species met with were the Red-rumped Parrakeet, *Psephotus hæmatonotus*, Cockatoo Parrakeet, *Calopsittacus novæ-hollandiæ*, Warbling Grass-Parrakeet, *Melopsittacus undulatus*, and the handsomest of all, the Many-coloured Parrakeet, *Psephotus multicolor*. Many of their nests were found in the hollow spouts of the gum trees, but the eggs in most instances were heavily incubated. Cockatoos were very numerous, the Leadbeater's, *Cacatua leadbeateri*, Great Sulphur-crested, *Cacatua galerita*, and the Black Cockatoo, *Calyptorhynchus funereus*, being the three species. A

nest of the first species was discovered in the hollow trunk of a Murray Pine, *Callitris verrucosa*, and contained two eggs. Porphyry-crowned Lorikeets, *Glossopsittacus porphyocephalus*, were also nesting in the hollow spouts of trees. The rare Night Parrakeet, *Geopsittacus occidentalis*, exists here, but we were unable to find any specimens. On the small sandy rises were numbers of the funnel-shaped traps of the "Ant Lion," Myrmelion, into which many ants, flies, &c., fell an easy prey.

These sandy ridges are natural flower gardens. One of the Native Honeysuckles, *Banksia ornata*, *Grevillea pterosperma* (with orange flowers), *Halgania cyanea*, *H. lavandulacea* (a showy plant with deep blue flowers), *Eremophila brownii* (with reddish-brown flowers), *Podolepis siemssenia* (with panicles of golden-yellow flowers), *Acacia hakeoides*, *Bœckea crassifolia* (with its small pink and white flowers), with many others, grow luxuriously. Parasitic on the branches of *Acacia hakeoides* was noticed the rare scale-insect *Lecanium mirificum*. Many "Bull Oaks," *Casuarina glauca*, were found dead or dying, and on examining them the remarkable coccid (named after my father, the original finder, by the late Mr. W. Maskell) *Frenchia casuarinæ*, like so many hundreds of small pieces of wood plugged into the trees, was found to be the cause of the destruction of these fine timber trees. This coccid is also common around Port Phillip, where it attacks the "She Oaks," *Casuarina quadrivalvis*, and it is only a matter of a few years before all the smaller Casuarinas will be completely destroyed. Mr. Maskell has placed this genus amongst the Brachyscelidæ, as he states it seems impossible to place it elsewhere. He further states that "it is not clear by what process the burrowing into the bark is effected. The larva does not seem to do it, at least to any great depth. As for the gall-like swellings of the plant, they may be accounted for in the usual way as the result of irritation caused by the suction of the insects." Yet I see nothing to indicate that this coccid has any organs of irritation not possessed by other coccids. Thus this question of gall-formation needs further investigation.

We next reached Pine Plains, another good collecting ground. Here the two species of eucalyptus, *E. gracilis* (the common Mallee) and *E. rostrata*, with Murray Pines, *Callitris verrucosa*, are the principal timber trees. Under the bark of the dead Murray Pines many specimens of the rare black carab beetle, *Gigadema intermedia*, were collected. On the sand-hills, amongst the fallen leaves, several showy beetles, also belonging to the Carabidæ, were secured, and transferred to the collecting bottle. In the thick Mallee we came upon several of the large mound nests of the Mallee Hen, *Lipoa ocellata*. As an interesting description of these egg-mounds was published in the *Victorian Naturalist*, vol. xvi., p. 149, there is no necessity for me to

repeat it here. Scrub-Robins and the Chestnut-backed Ground-Thrush were fairly common here. *Beyeria viscosa*, *Calotis cymbacantha*, *Prostanthera coccinea* (with showy scarlet blossoms), *Pimelea microcephala*, the "Quandong," *Santalum acuminatum* (a tree of about twelve feet in height, with drooping leaves, and particularly handsome when bearing its orange to crimson fruits), *Grevillea aquifolium*, *Halgania lavandulacea* (a showy plant when in bloom, having deep blue flowers), *Helichrysum obtusifolium*, *Stipa elegantissima* (a most beautiful and ornamental grass, well worthy of cultivation in gardens), *Waitzia acuminata*, *Goodenia geniculata* (a remarkable woolly variety), *G. pinnatifida*, and many other plants, are found in this locality.

On the plains the "Wallaby Grass," *Danthonia penicillata*, is the principal fodder grass. The "Lignum," *Muehlenbeckia polygonoides*, covers the marshy ground, and in these bushes were numerous nests of the "Babbler," *Pomatostomus superciliosus*, containing eggs. The White-plumed Honey-eater, *Ptilotis penicillata*, was nesting in the melaleuca bushes. Acres of acacias, such as *A. calamifolia*, *A. farinosa*, and *A. brachybotrya*, are met with, and, according to the late Baron Von Mueller, no less than thirty-six species of acacias have been found in the Mallee districts. Here also fine plants of *Cryptandra subochreata*, *Atriplex semibaccatum* (a splendid fodder plant), *Westringia rigida* (with bluish-white flowers), *Helipterum moschatum*, and *H. floribundum* were added to the collection. In the dead timber were several nests of the Crimson-bellied Parrakeet, *Psephotus hæmatorrhous*, which is also known as the "Bull Oak" Parrakeet, on account of its preference for the Casuarina ("Bull Oak") country. Peaceful Doves, Gilbert's Thickhead, Yellow-rumped Pardalote, Corcorax, Bee-eaters, White-faced Xerophila, Black-backed Superb Warbler, Red-throat, Black Honey-eater, Lanceolated Honey-eater, Tree Martins, Spurwing Plover, Red-capped Robin, Brown Hawk, Australian Goshawk, Black-backed Crow-Shrike, &c., &c., were the principal birds in this part of the country.

It is noteworthy that many of the plants growing in the Mallee are identical with those found on the heath grounds at Cheltenham and Sandringham, so familiar to the botanists of the Club. For instance, such plants as *Pimelea octophylla*, *Aotus villosa*, *Helichrysum apiculatum*, *Stackhousia linarifolia*, *Leptospermum lævigatum* (a small-leaved variety), *Caladenia patersoni*, *Prasophyllum elatum*, *Pterostylis vittata*, and *Goodenia geniculata* are common in both places. The Tea-tree, *Leptospermum lævigatum*, abounds everywhere on the sandy rises. The usual height, as far as was met with at Pine Plains and other localities visited, was from four to eight feet. Equally common with this was the shrub *Dodonæa viscosa*.

Very few species of fodder grasses seem to exist in these dry localities, the principal ones being the "Porcupine Grass," *Triodia irritans*, "Wallaby Grass," *Danthonia penicillata*, *Agrostis solandri*, *Poa fordeana*, *P. nodosa*, and *P. ramigera*. Of the "Porcupine Grass" the seed stalks and seed heads are the only parts eaten. But so fond do the horses appear to be of these heads that in places where the tussocks were growing very closely together we had great difficulty in getting our steeds away from them. The "Wallaby Grass" is also very nutritious, these two forming the principal fodder grasses of the arid Mallee.

The caterpillars of the "Army Worm," *Heliothris armigera*, and a species of Agrotis had caused a vast amount of damage to the "Wallaby Grass" abovementioned, but, by way of compensation, the "Caterpillar Fungus" had attacked them, and the whole lot were probably destroyed. This would appear to be the same species of fungus which destroyed such numbers of caterpillars near Bacchus Marsh last September. It seems to attack them in the following way:—"The caterpillars generally crawl to the top of the stems of the juncus, &c., and fasten themselves tightly on, and as the fungus nearly always starts in the lower part of the body, though in some cases it may commence from the head, it gradually causes the caterpillar to decay, and in numerous instances pieces may be seen dropping off. I frequently noticed the lower half of the caterpillar had fallen away, while the remaining part was still living. The caterpillar finally rots away, the head and fore legs only remaining fastened to the plant. The caterpillars when attacked by the fungus soon exhibit a sickly appearance, assuming a light greyish colour, but the fluid in the body of the grubs dying from the effect of the fungus is of a dark greyish-green. So rapidly do the caterpillars succumb to the fungus that on returning to the spot where I had observed apparently healthy grubs the day before, I collected fully two hundred, either dead or dying, and in a few hours afterwards there was not a living specimen to be found, only their remains hanging to the tops of the plants. This fungus was first discovered in Victoria by Mr. C. C. Brittlebank, who made some interesting observations for Mr. D. M'Alpine, who has identified it as an Entromopthora, a group now recorded for the first time in Australia, and Mr. M'Alpine proposes the name *Entromopthora australis* for this species. If this fungus could be utilized in attacking these "Cut Worm" caterpillars which cause so much damage to the crops in this and other colonies, it would prove a great boon to cultivators. Mr. Froggatt, the Government Entomologist of New South Wales, has also found a fungus in his colony closely allied to the one under notice.

Having spent a few days in this interesting spot we started for Yallum, about 20 miles from Hopetoun. This is another good

locality for the botanist, as such plants as *Aster picridifolius*, *Solanum esuriale*, *S. simile*, *Acacia brachybotrya*, *Calocephalus Sonderi*, *Myosorus minimus* (commonly called the "Mouse-tail" Plant), *Cassinia arcuata*, *Eriostemon pungens*, *Logania linifolia*, *Brachycome pachyptera*, *Helichrysum leucopsidium*, *Eremophila longifolia* (the finest tree in the Mallee, bearing white flowers), *Dampiera lanceolata* (with beautiful blue flowers), *Billardiera cymosa* (also with blue flowers), *Senecio d'altoni*, *Pittosporum phillyroides* (a species having a peculiar drooping habit and minute yellow flowers), *Calycothrix tetragona*, and *Thryptomene ciliata*—the two latter are beautiful flowering shrubs well worthy of introduction into small gardens, being of easy growth, and doing well near Melbourne in sandy soil—together with many other interesting species, grew in abundance. The common showy everlasting, *Helichrysum lucidum*, a well-known native plant, which is now cultivated all over the world, grew to fully four feet in height.

The Bower-birds were rather scarce; only two or three were seen, but one of their bowers or playing grounds was met with. It was about three feet long and two wide, and at one end a quantity of bones, pieces of coloured glass, wire, lead, strips of red cloth, &c., were strewn about. On counting, the bones, principally the vertebræ of sheep, were found to number about one hundred and fifty pieces. Growing on the flats were our little orchid friends, *Pterostylis rufa*, var. *mitchelli*, *Caladenia patersoni* (the "Spider Orchid"), and the sweet-smelling *Prasophyllum fuscum*. The rare plant, *Teucrium sessiliflorum*, and the blue-flowered geranium, *Erodium cygnorum*, grew in abundance.

The only lizards observed were the common Rough-backed Blue Tongue, *Trachydosaurus rugosus*, and the Lace Iguana, *Hydrosaurius varius*. The former was noticed feeding on the flowers of the "Blue Bells," *Wahlenbergia gracilis*.

Snakes were exceedingly scarce, the Brown Snake, *Diemenia superciliosa*, being the only species noticed. Occasionally several of the small species of snakes are found, and also the "Death Adder," *Acanthophus antarcticus*, but the latter appears to be rather rare in Victoria.

The foregoing somewhat disjointed notes will, I hope, serve to give some idea of the natural history of the Mallee, and I can safely guarantee any botanist, ornithologist, or entomologist who can spare the time for a few days' investigation of that portion of our colony during the months of September, October, or November in a favourable season, a most interesting outing, with the further possibility of adding new species to the lists of our fauna and flora.

DESCRIPTION OF EGGS OF THE RAINBOW PITTA, *PITTA IRIS*.

By D. Le Souef, C.M.Z.S.

The eggs of this interesting bird were found on the Daly River, in North-Western Australia, on 24th December, 1900, and a description of the parent bird sent. As is well known, this is the only Pitta known in North-Western Australia, and it has a wide range, extending from Cape York, Queensland, right across to the north-west coast, inhabiting the thick scrubby country of the coastal districts. The nest was situated, as usual, on the ground, and contained four eggs—the full clutch. They are very blunted at the smaller end, and nearly round in shape; the texture of the shell is fine and somewhat glossy, and white in colour, with a few roundish small blackish markings, mostly on the larger end, where they form an irregular zone; but some have the markings more scattered over the egg than others. The few markings beneath the surface are purplish-grey. The measurements are:—(*a*) .91 x .80 inch, (*b*) .92 x .79 inch, (*c*) .93 x .81 inch, (*d*) .93 x .80 inch.

BOOK NOTICE.

Handbook of the Destructive Insects of Victoria. Part iii. By C. French, F.L.S., Entomologist to the Department of Agriculture, Victoria. Melbourne, 1900. Price, 2s. 6d.

After a lapse of seven years, for which the author is not responsible, we have to record the publication of the third part of the "Handbook of the Destructive Insects of Victoria." Where there is so much to be done in the way of spreading information as to the best means of coping with the insect pests so destructive to our fruit and grain crops, it is greatly to be regretted that the Department of Agriculture has not sufficient funds at its disposal to issue these excellent handbooks at much shorter intervals. The part under notice contains twenty-nine chapters, twenty of which are descriptive of insects, while eight are devoted to descriptions of our most useful insectivorous birds—a valuable addition in such a book. The birds dealt with are the White-eyebrowed Wood-Swallow, the White-rumped Wood-Swallow, the Narrow-billed Bronze Cuckoo, the Pallid Cuckoo, the Restless Fly-catcher, the White-shafted Fan-tail, the Brown Tree-creeper, and the White-throated Tree-creeper. In order that there may be no mistake on the part of agriculturists and fruit-growers as to their feathered friends or foes, each bird is illustrated by a coloured plate. Among the insects dealt with are the common Victorian Locust, of which a full account of its life-history, together with illustrations of its own parasitic destructors, is given; the dreaded Son Jose Scale; the Cut-worm Moths; the Phytomyza Leaf Tunneller; and the Painted Apple Moth. Other insects figured, such as the Gum Emperor

Moth; the Wattle Goat Moth, the Caper Butterfly, the Banksia Beetle, *Uracanthus triangularis*, and the Banksia Borer, *Cyria imperialis*, might come under the heading of what may be termed "collectors' insects," as they are large and mostly showy creatures, but, if we except the Emperor Moth, which has taken to the so-called Pepper trees, *Schinus molle*, as a food-plant, though no doubt very destructive to our native vegetation, have not as yet developed a taste for cultivated trees and plants. A chapter on cyanide fumigation, and appendices containing descriptions of spray pumps, &c., with illustrations, and a list of insect and blight-destroying agents complete the volume. The plates are by Messrs. C. C. and T. A. Brittlebank, and have been printed in colours by Messrs. Sands and M'Dougall Limited or Troedel and Co., and reflect great credit on both artists and printers. The author is to be congratulated upon the conciseness and clearness of his directions for dealing with the various pests, and it is to be hoped that Part iv., which he says is in preparation, will be published before many seasons are past.

The True Quagga.—The *Zoologist* for February contains an interesting article by Graham Renshaw, M.B., on the true Quagga, which now, alas, can be counted among the extinct animals of South Africa. Though this animal once existed in countless herds both in Cape Colony and what was recently the Orange Free State, and was proved to be an animal which could have been domesticated and made serviceable to man, yet so great was the slaughter of them for the sake of their hides that not a single living specimen now exists, and, what is more to be regretted, they are represented in very few museums. Mr. Renshaw has been at considerable trouble to get a complete census of all the remains treasured up in museums, with the following result:—England possesses three stuffed specimens, three skeletons, and two skulls; United States, one skeleton; Continent of Europe, ten stuffed specimens and several skulls or skeletons; while South Africa possesses only *one*, and that a *foal*, in the Capetown Museum. Thus has *Equus quagga* almost vanished from the face of the earth, yet strangely enough its native home is a continent infested with with the Tsetse Fly, and cursed with horse-sickness, where it might have been of immense service to those who have been the means of its extermination.

Parrakeets.—Mr. W. T. Page, F.Z.S., in *Nature Notes* for March gives a list of parrots and parrakeets which may be kept out of doors all the year round in England. Among the species mentioned are several Australian ones, such as the Rosella, the Cockatoo Parrakeet, the Red-backed Parrakeet, the Pale-headed Parrakeet, the King Lory, and Pennant's Parrakeet. This latter has bred out of doors in Yorkshire, one of the coldest and bleakest English counties.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 20th May, 1901. Mr. T. S. Hall, M.A. (one of the vice-presidents), occupied the chair, and about 50 members and visitors—included amongst whom was Mr. J. H. Maiden, F.L.S., of Sydney—were present.

REPORTS.

The hon. librarian acknowledged the receipt of the following donations to the library :—"Mineral Resources of New South Wales," by Edw. F. Pittman, Government Geologist, from the Department of Mines, Sydney ; "Report of the Trustees of the Australian Museum, Sydney," for 1899, from the Trustees ; "Proceedings of the Royal Society of Queensland," vol. xvi. (1900), from the Society ; *Queensland Agricultural Journal*, April, 1901, from the Department of Agriculture, Brisbane ; *Nature Notes*, April, 1901, from the Selborne Society ; *Bulletin of the American Museum of Natural History*, vol. xi., part 3, from the Museum ; and *Boletin Instituto Geologico de Mexico*, No. 14 (1900).

ELECTION OF MEMBERS.

On a ballot being taken, Mr. H. J. Grayson, University, Melbourne, was duly elected a member of the club.

GENERAL BUSINESS.

Nominations of office-bearers for 1901–2 were made, and Messrs. R. Hall and F. Pitcher were elected to audit the accounts for the year 1900–1.

A committee, consisting of Messrs. F. Wisewould, F. G. A. Barnard, and J. F. Haase (with power to add to their number) was appointed to arrange for a social gathering to commemorate the twenty-first anniversary of the foundation of the Club.

PAPERS READ.

1. By Mr. J. F. Haase, entitled "Notes on Collecting Lepidoptera."

The author briefly related some of his experiences when collecting, mentioning that on a hot day he had found a damp spot in a shady situation a great attraction to butterflies.

2. By Mr. A. W. Milligan, Perth, W.A. (communicated by Mr. F. G. A. Barnard), entitled "A New Species of Mirafra (Bush-Lark) from Western Australia."

The author described, under the name *Mirafra woodwardi*, a new species of Bush-Lark, somewhat resembling *Mirafra horsfieldi*, but being larger and more robust than that species.

3. By Mr. A. W. Milligan, Perth, W.A. (communicated by Mr. F. G. A. Barnard), entitled "A New Amytis (Grass-bird) from Western Australia."

The author described as *Amytis gigantura* a Grass-bird which he considered new, and gave particulars of its dimensions in relation to other members of the genus.

Mr. G. A. Keartland and Mr. R. Hall both remarked that in the absence of specimens it was difficult to say whether the birds described should not be regarded as varieties of known species.

On the motion of Mr. A. J. Campbell a vote of thanks was passed to Mr. Milligan for his papers.

4. By Mr. James Lidgett (communicated by Mr. F. G. A. Barnard), entitled "A New Victorian Coccid."

The author described, as *Lecanium australis*, a new scale insect, which is remarkable in being found inhabiting the borings made in timber trees by the larvæ of Coleoptera and Lepidoptera.

EXHIBITS.

By Mr. E. Anderson. — A series of the moth *Smyriodes aplectaria*, bred from larvæ found on *Ricinocarpus pinifolius*.

By Mr. A. Coles.—Stubble Quail, *Coturnix pectoralis*; also an albino specimen of the Australian Pipit, *Anthus australis*, from North Essendon.

By Mr. C. French, jun.—Rare Buprestid Beetle, *Chalcophora albivittis*, Hope, in wood of *Eucalyptus amygdalina*, near Dandenong Ranges.

By Mr. J. F. Haase.—Case of Victorian butterflies.

By Mr. T. S. Hall, M.A.—Fossil shell, *Cynthia praeputialis*, Heller, from Bream Creek.

By Mr. G. A. Keartland.—Kurdaitcha shoes, as worn by the natives of Central Australia.

By Mr. D. Le Souëf.—Type clutch of eggs of Rainbow Pitta, *Pitta iris*, described in *Victorian Naturalist*, vol. xviii., p. 18.

After the usual conversazione the meeting terminated.

Where the Birds Go To.—In a recent issue of the *Daily Mail* (London) some account was given of a sale of bird skins in that city. One firm sold no less than 2,151 female Birds of Paradise, while another had 847 and a third 531! These were sold in lots of 50 or 60 at from 16s. to 24s. per skin. One of the firms had 1,181 Impeyan Pheasants, together with large quantities of Osprey feathers, skins of parrots, jays, owls, crested pigeons, and other birds. A line of 1,000 lately deceased "Pretty Pollies" went off at 1¼d. each!

DESCRIPTIONS OF THE YOUNG OF SOME AUSTRALIAN BIRDS.

By Robert Hall.

(*Read before the Field Naturalists' Club of Victoria*, 15*th April*, 1901.)

As I have not been able to find any description recorded of the early phases of certain of our native birds, I propose to briefly describe such as have come under my notice, and have placed examples of most of them upon the table for inspection.

For the opportunity to describe the young of the Mallee Fowl, *Lipoa ocellata*, I am indebted to Mr. D. Le Souëf, C.M.Z.S., Assistant Director of the Zoological Gardens, Melbourne, where a number of these birds have recently been successfully hatched; and, in the absence of Professor Spencer, F.R.S., Director of the National Museum, Melbourne, skins of certain of the species have been kindly placed at my disposal for description by Mr. J. A. Kershaw, F.E.S., Curator of the Zoological Department of the Museum. The species are numbered and arranged in accordance with the "Key to the Birds of Australia and Tasmania," recently published.

29. Ninox boobook, Lath., Boobook Owl.

Fledgling, female, 15/11/97. Locality, Heytesbury, Victoria (per Mr. Geo. Graham). Recently in nest.

Whole of upper surface rich brown, except hind neck, which is grey washed with rufous, and composed of very short feathers; forehead feathers tipped with white; lores and fore part of eyebrow snow-white, the rachis of each lore feather being black and bristling; tail indistinctly barred; wing quills and coverts marked very much as in adult; under surface white, the throat faintly washed with rufous, the chest clearly washed with rufous; breast heavily blotched with clear rufous; lower part of abdomen and under tail coverts white, the feathers being long and soft; tibiæ rufous-feathered; tarso-metatarsus white-feathered; toes bear small white hirsute feathers. Length of wing, 9 inches; tail, 5.3 inches; culmen, 0.95 inches.

32. Ninox connivens, Lath., Winking Owl.

Immature skin. Culcairn, N.S.W., 15/11/98 (per Mr. W. J. Stephen).

This specimen was secured with the adult female. The under surface exhibits the key to the species, but a white collar extending from the throat, forming a complete circle and traversing immediately above the interscapulum, would lead one to anticipate another species. General plumage above dull slaty-brown; rump and upper tail coverts greyer; white spots on sooty-brown quills appear brighter than in adult owing to the greater contrast; throat white, the rachis of each feather brown;

the throat nestling feathers are long and silky; tail feathers show three faint bands, and are terminated distally each by a strong white mark; dull white feathers at the head of metatarsus; toes feebly provided with abnormal hirsute feathers; bill black, except at base and tip of culmen, which are light horn. Length of wing, 8.75 inches; tail, 4.9 inches; culmen, 1 inch.

49. STREPERA CUNEICAUDATA, Vieill., Grey Crow-Shrike.
Nestling, 28/9/99. Locality, Nhill, Victoria.
The general plumage is darker in colour than that of the adult, agreeing more with the sub-species *S. plumbea*, Gld. The feathers of the forehead, crown, and back are faintly rayed, the tips being brown; tips of wing quills greyish-white; under tail coverts greyish-white; tail quills, which are very short, are mostly white; feathers of lores stiff; bill brownish; middle portion of culmen orange; legs and feet greyish flesh. Length of wing, 5 inches; tail, 2.3 inches; culmen, 1.4 inches.

133. RHIPIDURA ALBISCAPA, Gld., White-shafted Fan-tail.
(*a*) Young. Mitcham, Victoria.
The whole of the dorsal surface deep slate colour, and much darker than the grey of adult; primary coverts have a double row of cinnamon-coloured edges to the feathers; secondaries edged with ochreous buff; throat feebly marked by white, with a black mark beneath; no white mark behind eye; chest, breast, and abdomen sandy buff; no distinct white on tail, except upon the shafts of all but the middle two; bill and legs black. Length of wing, 2.6 inches; tail, 3 inches.
(*b*) Immature female, 3/8/96. Warragul, Victoria.
Dorsal surface not so dark as in (*a*), but not the grey of the mature bird; throat whiter than in (*a*), but not so white as in adult; breast and abdomen not so ochreous as in (*a*), but deeper than the pale ochreous buff of the adult; white mark at rear of eye; the amount of white on tail about intermediate between that of (*a*) and adult. Length of wing, 3.05 inches; tail, 3.75 inches.

183. MEGALURUS GRAMINEUS, Gld., Grass-bird.
Immature skin, male, 29/12/99. Altona, Victoria.
Upper surface uniform tawny, with a few black streaks on the interscapulum; barb of middle quill of tail black; under surface fawn, tending to white from the chin to the breast, below which it is more tawny; no streaks upon the under surface, a single small one upon one of the lower throat feathers; wings very much as in adult, except that the edges to secondaries are fulvous; bill yellowish, other than the ridge of mandible, which is dark brown; legs brown, under portion of feet yellow. Length of wing, 2.05 inches; tail, 2.2 inches.

344. PTILOTIS CRATITIA, Gld., Wattle-cheeked Honey-eater.

Young male skin, 25/9/99. Nhill, Victoria (per Messrs. C. and C. Smart).

General appearance similar to adult, excepting fleshy wattle extending from gape down each side of the throat, which is dull orange in lieu of lilac; crown greenish; forehead grey; under parts dull yellowish-white and yellowish-grey; bill black, with base of under mandible yellow; legs and feet brown.

379. PARDALOTUS PUNCTATUS, Temm., Spotted Pardalote.

Immature skin, 5/11/99. Loch, Victoria.

Head spotted with pale yellow; all feathers of back broadly and faintly marked with yellowish-brown; upper tail coverts and rump tawny; tail black and spotted; wings black, with white spots, except first and second quills, and all smaller than in adult; the whole of under surface pale tawny; no yellow on throat; loral spot brown, with pale yellow tips; cheeks and sides of neck uniform tawny; bill black; legs flesh colour. Length of wing, 1.35 inches; tail, 0.8 inches.

421. MIRAFRA HORSFIELDI, Gld., Bush-Lark.

Skin, immature male, recently from nest, 18/12/97. Essendon, Victoria.

Before me at the moment are five skins, showing as many clearly defined phases in the plumage development of the species. As the bird matures, the black of the dorsal surface gives place to a ruddy greyish-brown, while the chest and breast markings lose the black, blotchy appearance through many stages till the dark rachis of the oldest bird is very narrowly defined upon a fawn or rufous-fawn ground colour. The throat in the adult assumes a clear white.

Very Young Male Skin.—Crescent-like narrow edge to each feather of the upper surface pale brown, the feathers other than these being deep brownish-black; chest heavily blotched with deep brownish-black, the centre of it being less dark, owing to the peripheral portion of each feather being of a cream colour; eyebrow fulvous; throat dull, impure white; outer tail quills show less white than in adult, and more deep brownish-black; the centre quills are more strongly rufous-marked than in adult; cheeks blackish; lower edges of each mandible showing distinctly yellowish against the other portion of the dull-brown bill; primaries very strongly marked with rufous. Length of wing, 2.7 inches; tail, 1.9 inches; culmen, 0.4 inch.

440. ÆGOTHELES NOVÆ-HOLLANDIÆ, Lath., Owlet Nightjar.

While making the Catal. Birds Brit. Mus., xvi. (1892) Mr. Ernest Hartert remarks (p. 646):—"There are few groups of birds about which our knowledge is less complete than the genus Ægotheles. We do not know whether one species possesses a

greyish and a rufous phase, and we do not know the changes in plumage which are produced by season and age."

Concerning the rufous phase, I have never seen it in Victoria, either in immaturity or adult stage. Still it may yet appear to us. From Derby, in the North-West, I have skins that agree in measurements with the well-known form, but they are very rufous. The young bird described below I take to be of the grey phase. In any case it now provides a record of at least one phase of the young of the species.

Fledgling.—Mounted specimen, National Museum. When killed it was nearly ready to fly. General appearance brownish-grey, as in adult; nuchal collar narrow and indistinct, but quite perceptible; the band anterior to it is just visible on the lateral parts; tail bars are brown, and only visible, the whitish ones of the adult not being yet clearly shown; the outer webs of the longest primaries creamy white when compared with the brown of the adult; a rufous mark beneath the eyes.

The blackish markings of the adult, I am disposed to believe, will not be represented without a moult of the present plumage.

The present example distinctly tends to the brownish grey phase of the species and not to the rufous one, presuming the two phases to be one and the same species. Length of wing, 3.4 inches; tail, 1.5 inches.

561. Leucosarcia picata, Lath., Wonga-Wonga Pigeon.

Whittlesea, Victoria, 28/1/00. Field Naturalists' Club of Victoria's excursion. Young, about three weeks from nest, judging by bare forehead and chin.

The specimen bears a strong resemblance to the adult, though it differs from that described in the British Museum in so far as the centres to some of the flank feathers are clearly marked and similar to the adult. The flank feathers appear in this specimen to be the last to mature, although beneath the wings the coverts are not fully developed. Chin, base of forehead, and around gape bare of feathers; lores featherless but for a few "blacks" immediately against the eyes; forehead, upper throat, breast and abdomen creamy white; a white horseshoe-like mark around the chest, the head of it joining the white of the breast; flanks creamy white, the feather centres conspicuously marked with black; under wing coverts white-edged; crissum fawn; whole of under surface (except chest), crown, hind-neck, and wings brownish-grey; rump and tail feathers deep grey; outer feathers of tail white-tipped; leg feathers deep brown, edged with cream; feet coral red; upper gular area slate; bill brown; eyes dark brown. Length of wing, 7 inches; tail, 6.1 inches.

566. Lipoa ocellata, Gld., Mallee Fowl.

The chick is born with prominent wing quills, which are more

than 4 inches in length on the fourth day. The first moult begins about the fourteenth day, both quills and contour "down" (neossoptiles) being shed; the latter are being displaced by contour feathers.

Specimen A.—Young; four days old. Skin, 3/3/00.

Under surface tawny, a tawny brown pectoral band joining the same (though deeper) colour on the neck; crown tawny brown, from which down to the tail the colour deepens, where it becomes a deep brown; flanks like breast; spot before and behind eye almost naked; surrounding the ear is a circle of black down-feathers; quills deep slaty-brown; coverts same, tipped with brown; down coverts tawny brown; no appearance of tail quills; bill horn-black, the lower edges of prongs pale coloured; legs and feet dull yellowish-grey. Total length, 8 inches; wing, 4.4 inches; tarsus, 1.25 inches; culmen, 0.75 inch; middle toe (without claw), 1 inch.

Specimen B.—Skin, male, 14 days old, 13/2/00.

Crown of head brown, marked with black, which are the quills of the coming black feathers; terminal parts of some of the old feathers still adhering; soft parts round the eyes pinkish-red, blending into cinnamon-brown over a large area; lores yellowish-pink; ear coverts short, slender, and dark; featherless tracts behind the eyes; short yellowish-brown plumage beneath the eyes; chin and throat quite feathered with original downs; nape a shade darker than crown; neck still darker, with black feathers coming on sides of lower neck and chest; the new feathers rapidly displace the original ones, which are pushed out and still adhere to the exposed ends of the new plumage for some time; breast cinnamon-brown; original downs as coverts to black tail quills; flank (towards shoulder) feathers mostly new and still coming, certain of the original long cinnamon-brown plumage remaining; humeral feathers show a long bar of black; wing primaries short, with coverts agreeing in colour; secondaries shorter; secondary coverts strong, fringed (downy), and faintly rayed with black, at ends cinnamon-brown; beneath the old secondary coverts may be seen new blackish quills appearing; under wing coverts are brown downs; bill deep brown to black, the lower edges of bottom mandible pale coral red; nostrils oval, yellowish within, dark outside, quite exposed; the feathers directed towards nostril short and cinnamon-brown; legs and feet dull yellowish-grey, nails being dull yellowish-brown, lighter at tips (0.45 inch long); iris dull yellowish-brown. Total length, 11.75 inches; length of wing, 6.5 inches; culmen, 0.75 inch; tarsus, 1.7 inches; middle toe (without claw), 1.2 inches; tail, 2.7 inches.

In this specimen the outer secondary (next to primary) of each wing was shed in the cage, and was being replaced in each

by another which is much shorter than the adjacent primary and secondary. The bird was born with these shed quills, which were 14 days old at fall. Mr. Le Souëf could get me no further information, as this living specimen died next day. From a special yard of 13 young birds (about 14 to 30 days old), Mr. Le Souëf collected 60 shed wing quills, ranging from 6.5 to 2.4 inches. Colour uniform nutty-brown, the under surface duller and lighter than the upper. The barrel of each feather has left the bird quite clear of its early covering. The largest are the primaries, the smallest primary coverts. The intermediate sizes, judging from the median position of the vane, are secondaries. This appears to me a first moult, although we dare not handle a specimen to see if new quills were replacing the old. Specimen B. succumbed in the cause of science, at a heavy financial loss. Only 16 tail quills were amongst these 60, and they were all damaged in the barrel and not moulted.

In the tail of the Gallinæ there are from 10 to 12 stiff radii bearing rami, springing from a slender rachis.

The caudal region of specimen A shows a neossoptile to be 1.5 inches long (sheath, 0.35 inch) and with 40 rami springing from it—27 visible from the slender but firm rachis in a bilaterally symmetrical way; 13 as if from the base of the rachis at the head of the barrel, but with the origin hidden. Some of the rami from this bunch branch.

In specimen B the original contour feathers in several cases are existing an inch away from the body upon the tips of the new feathers that have displaced them.

In the Melbourne Zoological Gardens Mr. Le Souëf pointed to two birds, about half the size of an adult six months old. They were ten weeks old. At the time (10/3/00) twelve young were in the "Zoo," ranging from three days to three months in age—the very successful results of the Assistant Director practically acting as their foster parent.

Specimen C.—Ten weeks old. 10/3/00. Head dull red, shading into dull saffron-yellow at upper neck; lower neck dull saffron-yellow; head and neck not feathered, showing bristles.

Specimen D.—Ten weeks old. 10/3/00. Much like the adult in miniature; duller neck colours; separation between feathered and unfeathered parts of neck sharp; breast lineated like adult.

Specimens three months old show the red and yellow of the neck clear and featherless.

651. STERNA NEREIS, Gld., White-faced Ternlet (Little Tern).

Locality, Snake Island, Victoria (25/12/98), per Messrs. C. and C. Smart.

Nestling about four days old.

Whole of under surface in white down; forehead white, with

spots black and confluent; crown white, with three conspicuous black lines; nape white, spotted with black; hind neck and sides of neck have neossoptiles, with conspicuous sheaths enclosing the bases; back and rump white, with blackish-brown patches; wings with short quills bursting at their tips, the other portions in white down; the lesser and greater wing coverts have each a bar of light brown upon them; axillaries brown, barred with black; lores white; bill brown; no tail quills; legs and feet dull yellow; eyes umber.

DESCRIPTION OF A NEW SPECIES OF MIRAFRA (BUSH-LARK) FROM WESTERN AUSTRALIA.

By Alex. W. Milligan, Perth.
(Communicated by F. G. A. Barnard.)

(*Read before the Field Naturalists' Club of Victoria, 20th May,* 1901.)

Mr. Bernard H. Woodward, F.G.S., the Curator of the Perth Museum, recently handed to me for identification a Passerine bird (in skin), stated to have been shot by the Museum Collector on the sand tracts near Onslow, on the north-west coast of this State.

After a careful examination I find it to be a new Mirafra, and I propose to name it *Mirafra woodwardi*, as a tribute and an appreciation of the very valuable services rendered by that gentleman not only to Australian ornithology, but also to science in general.

The bird under notice is a true scutelliplantar, showing with distinctness the scale divisions on the hinder aspect of the tarsus—a rare characteristic in the Passerines. It also possesses many of the other distinguishing characteristics of one or other of the Alaudidæ to which I propose to briefly refer. In general, and comparing it with the members of the Alaudine family, it is like the English Sky-Lark, *Alauda arvensis*, in that it has the diminutive first primary quill, and that it exhibits a perceptible crest, but it is unlike it in that it lacks the straight hind claw, and it shows an inequality in the length of the secondary quills as compared with the primaries. It is like the Calandra Larks, genus Melanocorypha, inasmuch as it possesses the stout vaulted mandibles characteristic of that genus, and that the wing is more pointed and that the secondaries do not reach the tips of the primaries, but unlike it in that it is smaller in size and the long straight toe is absent. It is like the Calandrellæ inasmuch as it possesses the rudimentary first primary and the curved hind claw, but unlike in that the secondaries are not as long as the primaries, and that it possesses a crest, which the Calandrellæ do not. It is like the Galeritæ, or Crested Larks, inasmuch as it possesses a crest, although not in such a pronounced form, and in the general

resemblance in length of the hind claw, but unlike in that the Galeritæ have slender bills and the first primary generally well developed.

In particular, and comparing it with the *Mirafra horsfieldi*, it is much more robust, and handsomer, possessing as it does a rich rufous brown, which predominates (although lighter on the under surface) instead of the indistinct ashen grey of *Mirafra horsfieldi*.

The spur, also, on the hallux is somewhat longer and the crest more perceptible and pronounced than in the latter.

I have appended a specific description, as also a table of the respective measurements of *M. javanica*, *M. secunda*, *M. horsfieldi*, and the member of the genus now being described.

Reference to that table will show that the last-mentioned is materially longer and bigger than the African form or the Australian forms, both as regards total length, wings, tail, and tarsi.

MIRAFRA WOODWARDI, sp. nov.

Chin, throat, and fore-neck pale buff, deepening into an irregular band of ferruginous blotches on the chest, and again fading into a uniform pale buff on the breast, abdomen, and under tail-coverts; flanks and thighs a deeper buff; and the under surface of the wings a uniform fawn, showing dark marking on web towards the extremities; tail feathers (12 in number) terminating evenly, the outer feather at either side passing almost to white; under-web darkish, with many of the remaining tail feathers alternating buff and blackish on either side of shaft. The whole of the surface (excepting the nape), and extending from the head to and including the tail, a rich, rufous brown, relieved with saggitate blackish centres and shafts marked with an indistinct band of greyish feathers. The secondaries do not cover the tips of the primaries; crest distinctly perceptible; mandibles stout and vaulted, and slightly compressed at sides; upper mandible horn-colour, deepest at culmen; lower mandible paler at point, fading into white; legs brown; irides dark brown.

Locality, Onslow, Western Australia.

COMPARATIVE TABLE OF AUSTRALIAN MIRAFRÆ AND *Mirafra javanica*.

Member of Genus.	Total Length.	Culmen.	Wing.	Tail.	Tarsus.
Mirafra javanica	5.2 / 5.5	0.6	2.85 / 2.95	1.8 / 1.9	0.9
,, secunda	5	0.5	2.8	1.8	0.7
,, horsefieldi	5.3	0.55	2.9	1.85	0.85
,, woodwardi	5.75	0.5	—	2.25	0.95

I regret that at present I am unable to give any particulars regarding its song or nidification, but I hope to do so later on.

DESCRIPTION OF A NEW SPECIES OF AMYTIS (GRASS-BIRD) FROM WESTERN AUSTRALIA.

By Alex. W. Milligan, Perth.

(Communicated by F. G. A. Barnard.)

(*Read before the Field Naturalists' Club of Victoria*, 20*th May*, 1901.)

Whilst recently examining two birds in spirits, sent me by Mr. Bernard H. Woodward, F.G.S., the Curator of the Perth Museum, I had need, for the purposes of comparison, of such of the genus Amytis and the genera allied thereto as were locally available.

The only skin of the genus referred to, readily procurable, was one thought to be *Amytis macrura*, but a brief examination sufficed to show that it was not that bird, and, further, that it did not answer to any other member of that genus hitherto described.

I have, therefore, to declare it a new species, and I base my declaration on the following external and structural differences, taking *A. macrura* as a type :—

Firstly.—The five rictal bristles characteristic of the genus are not so pronounced as in *A. striata* (a skin of which has since been furnished me), the two bristles nearest the nostrils being only just discernible to the naked eye. Under a powerful lens both *A. striata* and *A. gigantura* show six rictal bristles, the sixth being rudimentary.

Secondly.—The mandibles are less robust than in *A. striata.*

Thirdly.—The total length, as also the length of the wings and tail, exceed in a material degree those of any other member of the genus. A table of measurements is subjoined for comparison.

Fourthly.—Material differences in the colour of and dispositions of colour in its plumage compared with the other members of the genus.

These differences and dispositions may be summarized as follows :—

Present.—(*a.*) Rusty-red shoulder patch of *A. textilis.*

Absent. — (*b.*) Black cheek stripe of *A. textilis.*

(*c.*) Chestnut-red upper surface, dark fore part of crown, bright ferruginous lores, and white fore-neck and breast of *A. striata.*

(*d.*) Black cheek stripe, ashy-white lores, brick-red streak at forehead base, and dark brown ear coverts of *A. macrura* ; and

(*e.*) White lores, white cheeks streaked black, white under surface of body, and bright rufous sides of *A. goyderi.*

The feather striations are very distinctly and regularly marked.

The following is a specific description of the new species :—

AMYTIS GIGANTURA, sp. nov.

The whole of the upper surface extending from the forehead to and including the wings and tail a uniform dull brown, with the feathers of the head, neck, cheeks, mantle, tail, and wing coverts striated with white, the striations more numerous and emphatic on the head and nape; tail feathers (10) not striated, but shafts brighter brown than the web; chin, throat, and breast with lighter wash of brown tending towards fawn; feathers distinctly striated with white; abdomen still lighter, with striations fainter; a bright chestnut patch on each side of spring, but in front of thigh; under wing coverts light chestnut; under surface of tail feathers brown; shafts white at base, but becoming brownish towards extremities; web of tail feathers open, and shafts robust and distinct; primaries brown with bright brown shafts; first primary diminutive, second longer but much shorter than third, third distinctly shorter than fourth, the fourth and remaining ones almost of even length; mandibles bright brown; legs dark brown; total length culmen, wing, tail, and tarsus as per table.

Locality, Mt. Magnet, Western Australia.

The specific name of *macrura*, which would have been specially appropriate, having already been allotted, I propose that it receive the scientific name of *Amytis gigantura* (Gr. *gigas* + *oura*), and the vernacular name of the "Western Grass-bird."

COMPARATIVE TABLE OF THE GENUS AMYTIS ABOVE REFERRED TO.

Member of Genus.	Total Length.	Culmen.	Wing.	Tail.	Tarsus.
A. textilis ...	6.3	0.45	2.45	3.25	0.95
A. striata ...	6.8	0.55	2.45	3.4	1.05
A. macrura	6.5	0.55	2.55	3.1	1
A. goyderi ...	5.5	0.45	2.05	2.8	0.85
A. gigantura	7.25	0.5	2.75	3.75	0.95

It may be of some interest to know that the birds in spirits mentioned in the first paragraph were specimens of Carter's Desert-bird, and to which I had assigned a new genus. Subsequently the description of that bird in the *Victorian Naturalist* was brought under my notice, and which proved their identity.

THE LITTLE KINGFISHER.—Up to the date of the publication of Mr. A. J. Campbell's work on "Nests and Eggs of Australian Birds" the eggs of the rare Little Kingfisher, *Alcyone pusilla*, Temm., had not been discovered. However, on the 14th February, 1901, in the Cape York district, Queensland, a nest was found in a bank of a creek, containing five eggs, probably the full clutch. The eggs are nearly round in shape, texture of shell fine and glossy, and colour pearly white. Measurements.—(1) .82 x .72, (2) .79 x .71 inch.—T. A. BRITTLEBANK, Myrniong. 27/5/01.

DESCRIPTION OF A NEW SPECIES OF THE GENUS MALURUS.

By Alfred J. North, C.M.Z.S.,
Ornithologist, Australian Museum, Sydney.

Malurus assimilis, sp. nov.

Adult male.—Forehead, crown, and sides of the head purplish-blue, passing into a rich cobalt on the feathers round the eye and the ear-coverts; sides of the neck and a collar on the hind-neck velvety-black; mantle and upper portion of the back purplish-blue; lower portion of the back and rump velvety-black; scapulars chestnut-red; wings brown, the quills narrowly edged externally with brownish-white; tail dull blue, all but the two central feathers tipped with white; a triangular-shaped mark in front of the eye, the cheeks, throat, and upper portion of the breast deep black, the feathers on the sides of the breast tipped with deep purplish-blue; remainder of the under surface dull white, slightly tinged with pale brownish-buff on the flanks and under tail coverts; thighs brown; bill black; legs and feet dark fleshy-brown; iris dark brown. Total length, 5 inches; wing, 1.9; tail, 2.8; bill, 0.35; tarsus, 0.8.

Adult female.—General colour above brown; wings brown, the quills narrowly edged externally with brownish-white; tail dull blue; lores and a narrow circle of feathers round the eye rich chestnut; cheeks, sides of the neck, and all the under surface dull white washed with fulvous, paler on the throat; sides of the breast and flanks fulvous-brown; bill reddish-brown; legs and feet dark fleshy-brown; iris dark brown.

Habitat.—Gulf of Carpentaria, inland portions of Queensland, New South Wales, Victoria, and South Australia, Central Australia.

Types.—In the Australian Museum, Sydney.

I purpose distinguishing this species by the vernacular name of Purple-backed Superb Warbler.

A nest of this bird in the Museum collection, taken by the late Mr. K. H. Bennett at Mossgiel, New South Wales, in October, 1885, is a dome-shaped structure, with a narrow entrance near the top; outwardly it is formed of fine silvery-white dried grasses and flowering plant stalks, the inside being slightly lined at the bottom with plant down. Externally it measures 5 inches in height by 3 in width, and across the entrance 1 inch. It was built in a Needle Bush, *Hakea leucoptera*, at a height of 5 feet from the ground, and contained three eggs. The eggs are oval in form, the shell being close-grained and its surface smooth and lustreless. They are of a dull-white ground colour, which is sprinkled over with dots, spots, and blotches of faint pinkish-red, the markings predominating, as usual, on the larger end. Length—(*a*) 0.62 x 0.5 inch;

(*b*) 0.63 x 0.5 inch ; (*c*) 0.65 x 0.47 inch. A set taken by Mr. James Ramsay at Tyndarie measures—(*a*) 0.62 x 0.5 inch ; (*b*) 0.66 x 0.47 inch ; (*c*) 0.65 x 0.47 inch.

The above-described species belongs to that section of the genus Malurus in which the adult males are distinguished by their chestnut shoulders, and is more closely allied to *M. lamberti.* For a number of years past it has been known that the inland form of *M. lamberti* differs in colour from typical specimens obtained near the eastern coast of Australia. More than a quarter of a century ago Dr. Ramsay pointed out that the New South Wales birds differed in the tint of colouring from those procured in South Australia.* Subsequently Mr. George Masters made reference to two specimens obtained by Mr. K. Broadbent at the Gulf of Carpentaria, and stated that it may prove to be a distinct species, but for the present (at that time) he looked upon it as a local variety of *M. lamberti.*† These differences in colour have recently been brought more prominently under my notice while working at the Maluri, and on comparing a series from widely separated parts of the continent. Adult males from the Gulf of Carpentaria, Western Queensland, Western New South Wales, North-Western Victoria, and the inland portions of South Australia, hitherto recognized under the name of *Malurus lamberti*, may at once be distinguished, when compared with typical examples of that species, in having the crown and sides of the head purplish-blue instead of deep cobalt ; moreover, the feathers round the eye and the ear-coverts are rich cobalt instead of turquoise-blue, and the mantle and upper portion of the back purplish-blue instead of cobalt-blue. In the colour of these parts the species here characterized by me under the name of *Malurus assimilis* more closely resembles *M. pulcherrimus.* Both Western Australian representatives of this section of the genus, however, *M. pulcherrimus* and *M. elegans*, are widely separated from *M. lamberti* and its allies in having the throat and upper portion of the breast dark blue instead of black.

DESCRIPTION OF THE WHITE-BELLIED THICK-HEAD (FEMALE).

By Robert Hall.

The distinguishing characters of the female of the White-bellied Thickhead, *Pachycephala lanioides*, Gould, have not, as far as I am aware, appeared in print, and as two skins of this bird have recently been received from Mr. J. P. Rogers, of Derby, North-west Australia, I take the opportunity of recording a description

* Proc. Zool. Soc. 1875, p. 589.

† Proc. Linn. Soc. N.S.W., vol. i., p. 53 (1876).

of them. Mr. Rogers kindly supplied me with the particulars of the soft parts.

Adult female, Derby, W.A., 21/3/01.—Whole of upper surface brownish grey to grey, being nearest ashy-grey on the forehead, becoming grey as it recedes, and greyest on the upper tail coverts; the feathers of forehead and crown showing blackish centre streaks; wing coverts and quills brown to greyish-brown, the secondaries broadly margined with light grey, and the longest primaries narrowly on the outer margins; first primary of one wing dull cinnamon-brown, being displaced in the other by a new grey feather; tail greyish-brown, greyer below than above; chin and throat white, with a brown stripe along the rachis of each feather; under tail coverts white; chest, breast, abdomen, and flanks pale brown, each feather streaked down the midrib with blackish-brown; lores creamy white; narrow circle of feathers round eye white; ear coverts brownish, slightly lustrous; scapulars pale brown; under wing coverts white with dark lines; bill, upper mandible brownish-black, lower greyish, with the cutting edge brown; legs leaden grey; feet brown; irides reddish-brown. Total length, 8.25 inches; culmen, 0.75 inch; wing, 3.85 inches; tarsus, 1 inch; tail, 3.35 inches.

NEW NESTS AND EGGS OF AUSTRALIAN BIRDS.

By Robert Hall.

The following nests and eggs, with skins of the birds, have been forwarded to me from Derby, North-West Australia, by Mr. J. P. Rogers, a careful and enthusiastic field naturalist recently in Derby:—

Zosterops lutea, Gld., Yellow Silver-eye.

Nest.—Cup-shaped, shallow, firm, made of pale straw-coloured fibrous grasses, and plentifully spotted upon the external portion with whitish clotted spider webs; no special internal lining; nest suspended from horizontal twigs of a mangrove. Dimensions over all.—Diameter, 2.5 inches; depth, 1.5 inches; egg cavity, 1.75 inches broad x 12.5 inches deep.

Eggs.—Clutch *a.*—Three to the sitting, 17/3/01. Colour uniform pale bluish-green. Dimensions.—Axis, 0.65 inch; diameter, 0.5 inch. Clutch *b.*—18/3/01. One egg, one large nestling, and one bird recently hatched. Egg.—Axis, 0.6 inch; diameter, 0.5 inch. Both nests were placed upon a small mangrove bush, at about four feet from the ground, and when Mr. Rogers visited the second one (*b*) on 26/3/01 he found high floods had drowned the young birds.

MYZANTHA LUTEA, Gld., Yellow Minah.

Nest.—Bowl-shaped, slightly oval in shape; the rough outer portion made of short lengths of twiners, fastened together with wool, the inner part of the same materials more closely woven; lining of fine rootlets and grass fibre. Measurements.—Externally, 8 inches x 7 inches, with depth 3.75 inches; internally, 3.75 inches x 3 inches, with depth (egg cavity) 1.6 inches. Mr. Rogers remarks the nests were placed in green sprouts growing from the broken end of a limb of a Bloodwood tree, at about 20 feet from the ground.

Eggs.—Two clutches, 9/3/01. In appearance they vary considerably.

a. Two to the sitting. Ovate glossy surface, salmon coloured, mottled all over, but especially at the larger end, with reddish-chestnut; spotted with purplish-grey, as if partly beneath the surface, and not conspicuous. Dimensions.—a^1. Axis, 1 inch; diameter, 0.75 inch. a^2. Axis, 0.95 inch; diameter, 0.7 inch.

b. Three to the sitting. Long oval, dull reddish-buff, blotched and streaked with dull purplish-red or ruddy-brown fairly regularly all over the egg; pale purplish blotches of small and large areas appearing as if beneath the surface. Dimensions.—Axis, 1.1 inches; diameter, 0.75 inch.

PTILOTIS FLAVESCENS, Gld., Yellow-tinted Honey-eater.

One fresh egg being found in the nest alone would tend to indicate the sitting to be two or more. 2/3/01.

Egg.—Uniform dull salmon-colour, sparsely spotted, except at the broader end, which has a zone of dull red spots. Dimensions. —Axis, 0.75 inch; diameter, 0.5 inch.

ORNITHOLOGY has lost a promising student by the death of Mr. C. Smart, who was recently found drowned in a high tank on a farm at Pomborneit, where he was staying. It is supposed that, while in pursuit of his favourite hobby, he attempted to capture some owls or other night birds, and, missing his footing, struck his head against the tank and fell into it in an insensible condition, and was thus drowned. He and his brother, Mr. H. C. Smart, were getting together a good representative collection of Victorian birds, many of which had been exhibited at the Club meetings.

THE last news of Professor Spencer's expedition was from Barrow's Creek, about 1,200 miles north of Adelaide, and some 500 miles from its starting point. The professor writes that everything was so far satisfactory, and that he was sending back many hundreds of feet of cinematograph films of native dances, ceremonies, &c.; also a number of phonograph records of native songs and speech.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The twenty-first annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th June 1901. Mr. T. S. Hall, M.A. (one of the vice-presidents), occupied the chair, and about 50 members and friends were present.

CORRESPONDENCE.

From Mr. J. H. Gatliff, regretting his inability to attend the meeting, and desiring his name to be withdrawn from the list of nominations for the Committee for the ensuing year, owing to pressure of private business.

REPORTS.

A report of the excursion to Aitken's Hill, Somerton, on Saturday, 25th May, was given by the leader, Mr. T. S. Hall, M.A., who said that the outing was rendered rather unpleasant by the strong north wind which had to be faced in reaching the hill, which, though of volcanic origin, did not present any unusual features. The view from it, however, was worth the exertion expended. During the afternoon a search was made for a deposit of limestone marked on the geological maps near Broadmeadows, but which when found did not yield any of the fossils it is recorded to contain.

The hon. librarian acknowledged the receipt of the following donations to the library :—"Proceedings of the Linnean Society of New South Wales," 1900, part iv., from the Society; *Queensland Agricultural Journal*, May, 1901, from the Department of Agriculture, Brisbane; copies of "Australian Butterflies," by A. S. Olliff, F.E.S., from the New South Wales Naturalists' Club, Sydney; *Hawkesbury Agricultural College Journal*, vol. ii., part 6, from the College; *Nature Notes*, May, 1901, from the Selborne Society, London; and *Knowledge* and *Science Gossip*, May, 1901, from the proprietors.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. W. G. T. Stevens, Elm-road, Elsternwick, was duly elected an ordinary member, and Mr. A. W. Simpson, "Cornalla," *viâ* Deniliquin, N.S.W., a country member of the Club.

ANNUAL REPORT.

The hon. secretary, Mr. G. Coghill, then read the twenty-first annual report for 1900–1, which was as follows :—

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"To the Members of the Field Naturalists' Club of Victoria. Ladies and Gentlemen,—The twenty-first annual report of the Club for the year ending 30th April, 1901, which your Committee have now the honour of presenting to you, sees the Club, as it should be in view of its age, in full vigour, and ever gaining in workers and popularity.

"During the year the membership has increased to 155, comprising 139 ordinary, 2 life, 10 honorary, and 4 country members. The last have come in under the alteration to rule 4, whereby persons residing beyond a radius of 15 miles from the G.P.O. are deemed country members, and pay an annual subscription of 10s., with the same privileges as ordinary members.

"The meetings have been well attended, and when papers have been illustrated by limelight views the hall has been crowded. The papers read have been more numerous and diversified than usual. They comprise 22 on zoological, 9 on botanical, 5 on geological, and 4 on general subjects and trips; total, 40. The authors were—Messrs. D. Best, C. C. Brittlebank, A. J. Campbell, A. Campbell, C. French, jun., Fulton and Grant, J. H. Gatliff, T. S. Hall, M.A., R. Hall, T. S. Hart, M.A., G. A. Keartland, J. A. Kershaw, F.E.S., D. Le Souëf, C.M.Z.S., J. G. Luehmann, F.L.S., Geo. Lyell, jun., D. M'Alpine, Dr. Macgillivray, J. H. Maiden, F.L.S., A. J. North, C.M.Z.S., G. B. Pritchard, F. M. Reader, H. T. Tisdall, and O. A. Sayce. Besides these, five papers on birds or nests and eggs new to science, by Mr. A. J. North, C.M.Z.S., were printed in the *Naturalist.*

"The extra number of items on the business papers for the meetings have caused rather fewer natural history notes to be read, but the exhibits have been good, and the interchange of ideas over them shows out prominently how "live" our club is. Cannot more members bring exhibits? A little trouble taken in this way is well repaid by the interest shown at our meetings and by the pleasure afforded other members.

"The seventeenth volume of the *Victorian Naturalist* has been completed, under the editorship of Mr. F. G. A. Barnard, whose never-tiring energy in working for the Club are deserving of all praise, and who now receives our hearty thanks. The appearance of the *Naturalist* has been much improved by the kindness of Mr. E. H. Swan, of the Triumph Engraving Company, in gratituously providing half-tone blocks when required, and we take this opportunity of recording our thanks to him.

"We hail with satisfaction the publication of Mr. A. J. Campbell's work on 'The Nests and Eggs of Australian Birds,' and consider it a matter of congratulation that a member of the Club has done such good work, thus placing on record many results of the Club's outings or his fellow-members' observations.

"A 'camp-out' was held in November at the Maroondah Weir,

Healesville, and proved a success in almost every way, nearly all branches of natural history observers being represented in the party, and some interesting work being recorded.

"The programme of excursions drawn up for the year has been carried out and some very instructive and enjoyable afternoons spent. We again plead that members should strive to attend these outings in larger numbers, as being one of the best ways for them to get to know their fellow-members and to revive or quicken the love for natural history pursuits. The annual picnic was held at Blackburn, and was again a most pleasant re-union.

"The only course of practical evenings was a series of four on botany by Mr. H. T. Tisdall, which were much appreciated.

"The exhibition of wild flowers in conjunction with the October meeting was not quite up to the standard of past years, though, to somewhat counterbalance this, almost all the specimens were named.

"The Club has during the year had letters written to the proper quarters relative to the destruction of the Wattle (Acacia, various species); the spread of the Water Hyacinth, *Pontederia speciosa*; and of the Iris, *Romulea bulbocodium*; the keeping closed of the Lake Moodemere Reserve at Rutherglen; and the too early opening of the Quail season—all, we trust, with some result.

"Our National Museum has been re-opened in its new quarters at the Public Library buildings, the change in the appearance and display being a great credit to the director, Professor W. Baldwin Spencer, F.R.S. We trust the Government will shortly complete the buildings, and thus give room for the exhibition of the treasures now stored away, and consequently of little present use to students.

"We have to thank the various authors of papers, contributors of illustrations, leaders of excursions, and demonstrator at practical evenings for their aid in the work of the Club, and Messrs. Morton and Coghill for the use of their offices for committee meetings.

"The hon. librarian reports that the library has been increased by nearly 200 volumes and parts of proceedings, &c., and that it is in good repair and the books arranged systematically. The necessary binding has been done, and records of all donations made, while members have availed themselves of the books rather more than formerly.

"We are glad to say that, despite heavy additional demands for the printing of the *Naturalist*, the finances show a slight improvement. The year commenced with a credit balance of £4 2s. 3d., and concludes with one of £7 8s. 3d., with all accounts paid, the receipts having been £118 14s., and the expenditure £115 8s.

"In concluding this report we cannot refrain from thanking

those gentlemen who, twenty-one years ago, entered so energetically into the formation of this Club, and to some of whom its continued success is in a large measure still due, for having founded a Club which has so decidedly met a want and given pleasure to so many.

"We trust that all members will endeavour to keep the Club not only up to, but above its present standard, and never forget that the member they introduce may become one of the best workers in the Society.

"Signed, on behalf of the Committee,

"T. S. HALL, *Vice-President.*

"GEO. COGHILL, *Hon. Secretary.*

"Melbourne, 10*th June*, 1901."

The report was received and adopted, on the motion of Messrs. H. T. Tisdall and F. Wisewould.

FINANCIAL STATEMENT.

Mr. J. F. Haase, hon. treasurer, read the financial statement for 1900–1, which was as follows :—

RECEIPTS.

To Balance, 30th April, 1900								£4	2	3
,, Subscriptions				£98	6	0				
,, *Victorian Naturalist*—										
Subscriptions ...	£6	10	6							
Sales	3	14	0							
Advertisements ...	4	10	0							
Reprints	5	13	6							
				20	8	0				
								118	14	0
							£122	16	3	

EXPENDITURE.

By *Victorian Naturalist*—										
Printing	£80	4	0							
Reprints	4	13	6							
				£84	17	6				
,, Rooms—Rent and Attendance				9	0	0				
,, Library—Books ...	2	10	0							
Periodicals ...	5	1	0							
Binding ...	2	0	6							
Insurance ...	0	6	6							
				10	8	0				
,, Printing and Stationery				0	12	6				
,, Postages, &c.				10	10	0				
							£115	8	0	
,, Balance							7	8	3	
							£122	16	3	

J. F. HAASE, *Hon. Treasurer.*
30*th April*, 1901.

Audited and found correct.
FREDERICK PITCHER, } *Auditors.*
ROBERT HALL, }

30*th May*, 1901.

The following statement of assets and liabilities was also read :—

ASSETS.

Balance in hand	£7	8	3
Arrears of Subscriptions, say	30	0	0
Library and Bookcases	125	0	0
	£162	8	3

LIABILITIES.

Subscriptions Paid in Advance	£3	15	0

On the motion of Mr. R. Hall, seconded by Mr. D. Le Souëf, the statements were received and adopted.

OFFICE-BEARERS FOR 1901–2.

The following office-bearers were declared duly elected, being the only nominations received :—President, Mr. T. S. Hall, M.A. ; vice-presidents, Messrs. D. Le Souëf, C.M.Z.S., and O. A. Sayce ; hon. treasurer, Mr. J. F. Haase ; hon. librarian, Mr. F. E. Grant ; hon. secretary, Mr. J. A. Kershaw, F.E.S. ; hon. assistant secretary and librarian, Mr. J. M'Caw.

A ballot for five members of committee resulted in the election of Messrs. E. Anderson, G. Coghill, J. Gabriel, G. A. Keartland, and F. Wisewould.

A vote of thanks to the retiring office-bearers, with special mention of the services rendered to the Club by the retiring hon. secretary, Mr. Geo. Coghill, was proposed by Mr. F. Wisewould, seconded by Mr. A. J. Campbell, and carried by acclamation. The newly-elected president, Mr. T. S. Hall, M.A., thanked the meeting for the vote, and Mr. G. Coghill acknowledged the special reference to his work.

PAPERS READ.

1. By Mr. G. B. Pritchard, entitled "Eocene Deposits at Moonee Ponds."

The author gave the locality of a recent discovery of Eocene fossils near Moonee Ponds railway station, giving a list of the principal specimens identified, and comparing them with the species obtained in other localities.

2. By Mr. G. B. Pritchard, entitled "On a New Zeolite (Mooraboolite)."

The author recorded the occurrence in the Moorabool valley, near Maude, of a new variety of Zeolite, which he proposed to call Mooraboolite, and gave a description of it and its chemical constituents, which to some extent resembled Natrolite, but the relatively high percentage of potash contained undoubtedly marked it as a new variety.

3. By Mr. W. V. Fitzgerald, F.S.Sc., communicated by Mr. R. Hall, entitled "Plants New to Western Australia."

The paper included the description of a Lobelia, which the author regarded as new, and named *L. gouldii*, in honour of the finder, Mr. L. H. L. Gould, of Mount Malcolm. The plant flowers profusely late in September, and bears comparatively large violet flowers. He also recorded several plants from Western Australia for the first time.

Mr. F. G. A. Barnard remarked that in some respects the new Lobelia resembled *L. toppii*, recently described by Mr. J. G. Luehmann, F.L.S., Government Botanist, also from Western Australia, and that it was a pity specimens had not been forwarded in illustration of the paper.

4. By Mr. R. Hall, entitled "A New Species of Ægotheles (Owlet Nightjar)."

The author briefly pointed out the distinguishing characters of this bird, which had been forwarded to him from Derby, North-Western Australia, and which he proposed to name *Ægotheles rufescens*, the Rufous Nightjar. The nearest allied species is *Æ. albertisi*, Sclater, from New Guinea.

The type specimens will be presented to the National Museum, Melbourne.

Messrs. A. J. Campbell, G. A. Keartland, and D. Le Souëf congratulated Mr. Hall on the good work he was doing in the birds of Australia, and considered the new species a good one.

NATURAL HISTORY NOTES.

Mr. E. Anderson read an extract from a recent publication on the new mammal, the Okapi, *Helladotherium johnstoni*, resembling an ass and a zebra, from the Congo Free State, portions of which had just been received in England.

The President took the opportunity of mentioning that Prof. J. W. Gregory, D.Sc., had been elected a Fellow of the Royal Society of London, and congratulated the Club on the fact that another of its members had received that high honour.

EXHIBITS.

By Mr. E. Anderson.—A series of bred specimens of *Selidosema exprimataria*.

By Mr. T. A. Brittlebank—Eggs of the Little Kingfisher, *Alcyone pusilla*, from North Queensland.

By Mr. A. Coles.—The skeleton of a Native Cat, the skull of which was firmly fastened within the dried skin of a lizard as when found.

By Mr. C. French, jun.—Scale insects, *Lecanium frenchi*, Mask., on banksia, from Cheltenham.

By Mr. D. Le Souëf, C.M.Z.S.—Red-shouldered Phasma, *Tropidoderus rhodomus*, M'Coy.

After the usual conversazione the meeting terminated.

FIELD NATURALISTS' CLUB OF VICTORIA.

TWENTY-FIRST ANNIVERSARY.

A MUSICAL re-union in commemoration of the twenty-first anniversary of the foundation of the Club—6th May, 1880—was held at the Vienna Café, Collins-street, on Tuesday evening, the 25th June, 1901. The president, Mr. T. S. Hall, M.A., occupied the chair, and there was a good attendance of members and their lady friends. Letters apologizing for absence and conveying good wishes for the future of the Club were read from the Rev. J. J. Halley and Mr. A. H. S. Lucas, M.A., Sydney, former presidents; from Dr. T. P. Lucas, Brisbane, one of the first vice-presidents; and from Mr. A. J. North, C.M.Z.S., Sydney, and Mr. F. C. Christy, C.E., two of the "original members" of the Club. Of the "original members" on the Club roll, numbering 56, in the interval of twenty-one years about one-third have passed away, while several have removed to other colonies, leaving only 14 who have remained members throughout the term; of these pioneers, nine were present at the re-union, two reside out of Victoria, the remaining three being unable to attend. In addition to these Lieut.-Colonel Goldstein and Mr. W. T. Kendall, two of the first committee, were also present. Towards the entertainment of the company, Mr. A. J. Campbell kindly placed his albums of views taken during the King Island, Kent Group, and Furneaux Group expeditions at the disposal of the committee, and the editor, by a complete set of the *Naturalist*, showed to some extent what the Club had accomplished.

After an overture by Mrs. Freedman, and songs by Miss Meta Haase, Mr. C. Dunlop, and Mr. Hector Lightfoot, Mr. C. French, F.L.S., one of the Club's founders, gave "Some Early Reminiscences of the Club," in which he described the misgivings with which he and Mr. D. Best and the late Mr. D. Kershaw called the preliminary meeting, and their surprise at the number of interested persons who responded to their appeal. Mr. French's remarks proved very interesting to many present, and he was followed by Mr. D. Best (the first honorary secretary), Lieut.-Colonel Goldstein, and Mr. W. T. Kendall, who added some recollections of the "early days" of the society. Songs by Mrs. F. G. A. Barnard and Mr. Walter Wyatt concluded the first part of the programme. After an interval, during which light refreshments were handed round, the president announced that he then had a very pleasing duty to perform, in the presentation to Mr. Geo. Coghill, the retiring honorary secretary, of a set of "Chambers's Encyclopædia," half-bound in morocco, which had been subscribed for by his fellow-members as some recognition of the good work he had done as hon. secretary during the past four years, and bearing in mind that he had acted as assistant hon. secretary for six years in

the earlier history of the Club, and had always been an enthusiastic and hard worker on the occasions of the wild flower exhibitions. Mr. Coghill briefly returned thanks, and said that he would always treasure the volumes as a reminder of the many happy evenings he had spent with the members of the society. After a song by Mr. Arthur Ellemor, and a recitation by Miss Carrie Haase, Mr. F. G. A. Barnard said that he desired to present to the Club, through the president, a framed record he had prepared, showing the office-bearers during the twenty-one years, together with a list of the original members, and tablets stating that 550 papers had been read at the meetings, and seventeen volumes, containing 3,084 pages, of the *Victorian Naturalist* had been published as the visible results of the twenty-one years' existence. The president, in accepting the gift, said that it would be an interesting exhibit in the Club's meeting-room, and trusted Mr. Barnard would long continue to work for the Club as heartily as he had done in the past. After songs by Messrs. Lightfoot and Wyatt, and a vote of thanks to the performers had been carried by acclamation, the National Anthem was sung. All the members present contributed their signatures to a memento of the evening, which will be framed and hung up in the Club room at the Royal Society's Hall. The evening proved such a success, both musically and socially, that hopes were expressed that it would not be long before the Club attempted another such gathering.

NOTES ON THE LOWER SILURIAN AND GRANITE OF THE UPPER WERRIBEE.

By C. C. Brittlebank.

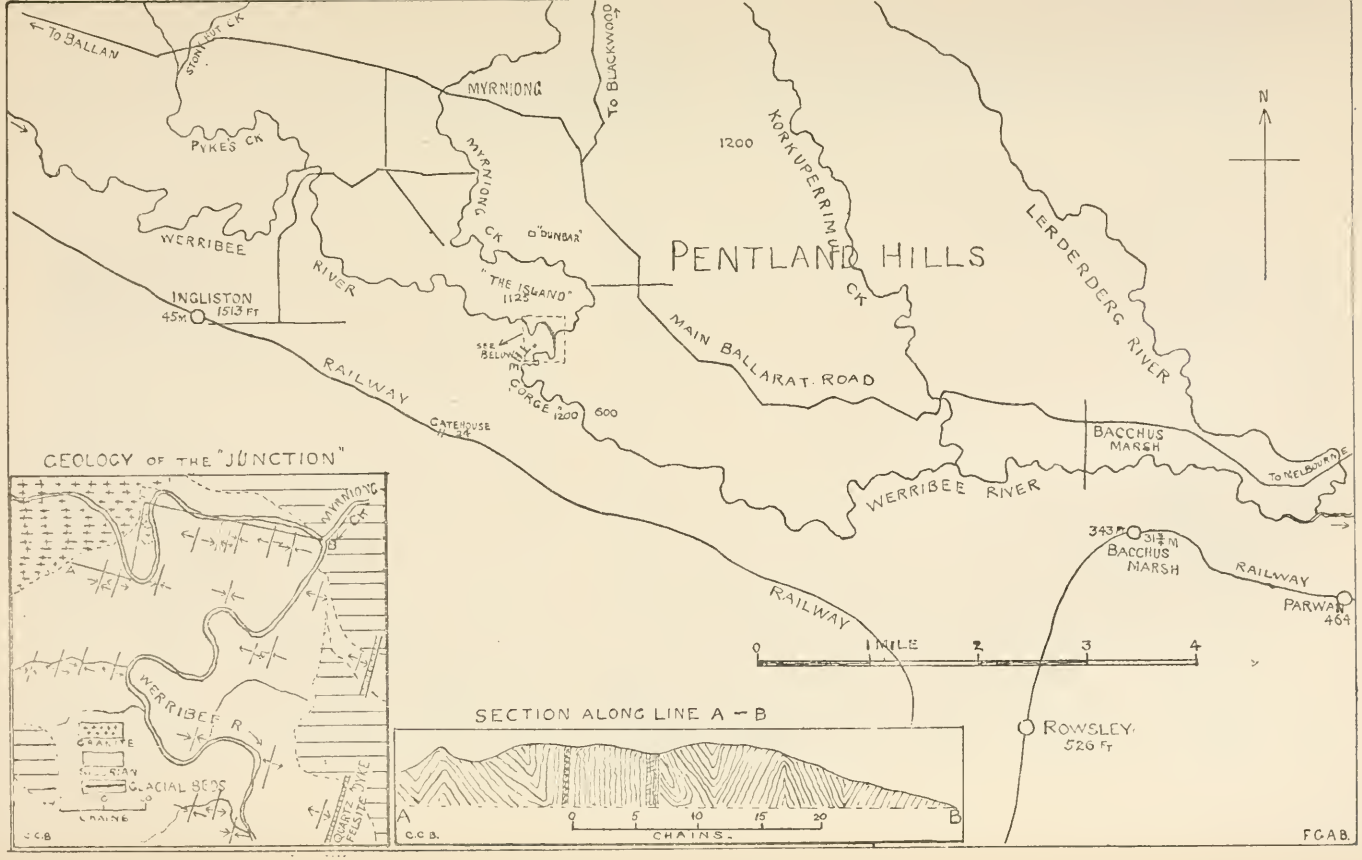
(*Read before the Field Naturalists' Club of Victoria*, 13*th August*, 1900.)

The district referred to under the above name commences about 5½ miles west from Bacchus Marsh, extends to the junction of the Stony Hut with Pyke's Creek, and is situated in the parishes of Gorrockburkghap and Gorung.

The country is drained by the Werribee and its tributaries, viz., Myrniong and Pyke's Creeks, all of which run in a more or less south-easterly direction.

Within this area the geological formations are of great interest, and comprise—Lower Silurian; Granite; Glacial Series (Bacchus Marsh Sandstones); Bacchus Marsh leaf beds (Miocene of the Geological Survey); Older Volcanic; Clay, Sand, and Pebble beds; Newer Volcanic; and Recent.

It is my intention to give a brief sketch in which an attempt will be made to show some of the features of the Lower Silurian and their relation to the Ingliston Granite, which is visible over an area of about 12 square miles.



WERRIBEE GORGE AND DISTRICT.

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The Silurian to the east of the Granite, as well as the eastern boundary of the latter, is shown on the Geological Survey Quarter Sheet Map No. 12, N.E. (Bacchus Marsh), and the sections accompanying the map show the folding of the Silurian and clearly indicate the intrusive nature of the Granite.

However, in working out the sections given herewith I have obtained somewhat different results from those given by the Geological Survey. At the time of the survey the sections were clothed with a dense scrub woven together by various climbing plants. This, together with the surface soil, has, owing to the introduction of rabbits, been almost entirely removed; however, I find the map accurate in boundaries, position, and direction of watercourses, hill shading, &c., and greatly regret that the country to the west is beyond the pale of the survey.

Starting from the first exposed section of Silurian on the Werribee River about 5½ miles west from Bacchus Marsh, and following the river and gully beds beautiful sections are seen; they vary in height from a few to over 500 feet, and are composed of clay, slate, quartzite, quartzose, and sandstone bands all highly inclined, the dip ranging from 30° to 90°, the average being about 70°. Generally speaking the dip to the west is higher by 10° to 20°. Several anticlines have been observed in which the dip to the west is from 40° to 50° greater than the eastern leg. Current bedding, or, rather, a rapid thinning out of sandstone and other beds, and probably ripple marks, have been observed. Anticlines and synclines follow in fairly rapid succession, on an average six to the mile.

Following the axes of the folds to the south, some are observed to gradually die away, while others become more strongly developed, and fresh folds appear. Mr. T. S. Hall, M.A., has recorded a similar feature in a paper read before the Royal Society of Victoria, 10th May, 1894, entitled "The Geology of Castlemaine, with a Subdivision of Part of the Lower Silurian Rocks of Victoria and a List of Minerals." The pitch of the anticlines is fairly steep, being between 8° and 15°. Several have, however, been observed with the pitch as high as 60°. When seen in section, with the pitch towards the observer, they are somewhat difficult to make out. Generally speaking local movement has been detected in the immediate neighbourhood of anticlines with an abnormal pitch.

Faulting has not been detected to any great extent. One of about 40 feet, and many others of less amount, have been observed. In cross-faulting the movement has been from west to east; several beautiful examples of slight faulting are to be seen in the cuttings on the Ballarat and Melbourne railway line.

Cleavage is developed in certain portions of the Silurians, almost if not quite obliterating the bedding planes, generally

dipping to the west between 30° and 90°; but in many places cleavage has been observed dipping 25° to 85° E. Sometimes, though rarely, it coincides with the bedding. Ten chains west from the starting point beautiful cleavage is seen in fine-bedded clay slate; where the more strongly developed planes intersect bedding of slightly different colours the junction has been drawn into finely serrated lines.

At 52½ chains below the junction of the Myrniong Creek with the Werribee a peculiar structure has been developed in massive blue crystalline beds. Where seen in section, numbers of fine, light-grey, irregular, ripply bands can be clearly traced, dipping 30° W. So closely do these bands resemble bedding of different colours that one might be easily deceived as to their nature. Closer inspection, however, shows that these bands cut through both legs of an anticline. From the westerly dip and their position they most probably represent cleavage planes which have been lost owing to the great change the slate bands have undergone.

Along the axes of folds a close-set radiating jointing has been developed. Very frequently thin sheets or films of quartz have formed in the wider joints. This fine jointing is best observed in the finer argillaceous beds. Spurs and veins of quartz, several inches in thickness, penetrate the fractures in the quartzites and sandstones on the crest and in the trough of anticline and syncline. Where alternating bands of clay, slate, and sandstone occur, cleavage has been developed in the former beds, and to such a marked degree that had the sandstones been absent it would be impossible to ascertain the true dip.

Over the whole Silurian area the strike is fairly constant, varying from N. 2° E. to N. 15° E., generally N. 10° E.

Numerous quartz-felsite and other dykes cut the Silurians, almost always through or near to the axis of an anticline—that is, in a more or less north and south direction. Several examples can be seen in the cuttings on the Melbourne-Ballarat line, east from Ingliston, and also to the north and south of the pile bridge on the same line, and in the Werribee Gorge. At right angles to the above there is a second series, which cut both the Silurians and older dykes, often passing into the overlying glacial beds. An example of this can be seen a few yards below the junction of the Myrniong Creek with the Werribee, where a branching almost vertical dyke has weathered out, leaving narrow openings.

Darwin when at Albany observed a series of parallel dykes running east and west, and not far away a second series of eight ranging at right angles to the former ones.

In passing I might mention that all the quartz-felsite dykes are of much greater age than the glacial deposits of Bacchus Marsh. There is not the least evidence to support the theory that the

dykes have been forced through the Silurian to the under surface of the glacial beds. In all cases where the junction has been observed the hard dyke rock shows striation and polishing by ice action.

As the visible eastern boundary of the Granite is approached the Silurian rocks show contact evidence at a distance of 18 chains. It is therefore my intention to give a more detailed account of the section between the junction of the Myrniong Creek and the Granite country on the west.

From the junetion up the river to the first anticline, 8.17 yards distant, the normal features of the Silurian are observed. On the south bank the anticline is seen in section, exhibiting radiating jointing or cleavage, with the usual quartz films. The pitch is S. 10° W. at 15°. Proceeding up the river the dip suddenly increases from 75° to 90°, and continues for 2.50, when it becomes inverted, and dips east at 75°. The massive sandstone and quartzite forming this fan-like structure are seamed with quartz veins and spurs, with here and there strings and threads of granite. Following closely upon the overturned strata, a syncline is observed overthrown 25° W. Within two chains and a half two anticlines and a syncline are developed, with the same angle of overthrow. A quartz reef three feet in width passes through the bedding, and can be traced to the top of the hill, 400 feet in height.

At the spot where we should expect to find the second anticline a steep gully runs up the face of the section. The rocks on either hand of this gully are greatly altered, and contain very numerous flakes and spangles of whitish mica, quartz and felspar crystals ; fine threads of granite and quartz penetrate the walls of Silurian. Parallel jointing is strongly developed, dipping at 30° W. In the bed of the gully, when cleared from fallen rock fragments, granite is exposed. I think there can be little doubt that the granite is part of a dyke which has weathered out, leaving the altered rocks on the east and west.

Westerly for seven chains purple slates and quartzites, containing patches and nests of schistose rock, together with strings and a vertical dyke of granite 9 to 12 inches wide. Contortion and pseudo-ripple markings are well developed ; the latter appear more extensively in localities which have been subjected to the greatest strain and pressure.

In sheltered places sulphate of copper and other mineral salts (some extremely acid) coat the surface of the rocks. Shallow caves and hollows have been formed by the continued action of these salts, which have probably been derived from the decomposition of copper pyrites. At the large bend in the river a syncline occurs, the dip being W. 90° E. 60°, and continues at the latter angle to the junction with the Granite, off which they lie.

A similar feature is observed several chains to the south-west, but owing to the angle of junction being somewhat in the same direction an additional anticline and syncline with minor flexures come in on the south-east, the anticline being beautifully shown in the face of a somewhat remarkable peak.

At the actual junction the Granite has invaded the Silurian along the bedding planes and joints. Some narrow veins appear to be composed of quartz, and others—one of which is five yards wide—of felspar, with a little quartz, greatly resembling graphic granite. In places the Silurian is fractured, the fragments being mixed through and partly absorbed by the granite. Small slabs of quartzite, sandstone, and nodular clay slate are observed at some distance from any known contact point, and, strange as it may appear, they still retain the normal strike and dip.

In many cases these fragments have been absorbed by the Granite, the only evidence of their once existence being a darker patch of finer crystallized material. Similar gradual changes from sedimentary to granular rock can be observed in many places.

The Granite in contact with and for some little distance west of the Silurian is of a slightly different type to that forming the mass, a fibrous or gneissose structure being developed. Jointing is well marked, one set being east and west with a dip of 70° N., another set N. 12° E. at about 90°. Numerous quartz veins intersect the granite, and several large bodies of rock, probably dykes, run in a north and south direction; these being somewhat harder than the country rock, they can be traced over the surface for a considerable distance.

The Granite country is generally open and undulating, with tors and bosses showing above the surface. Along the water-courses cliffs and bluffs, more or less steep, have been cut by the streams.

The Granite extends to the west for two and a quarter miles, the junction with similar sections of Silurian being observed a few yards above the junction of Pyke's Creek with the Werribee, and continues to within a few chains of the Ballarat and Melbourne road.

The sections seen in the cuttings on the railway between Ingliston and the gate-house No. 24 are, owing to their recent exposure, of a much lighter colour than the Werribee and Pyke's Creek sections. Several bands of blue-black shale are inter-bedded with the light-coloured rocks; they appear to be more numerous than they really are, owing to folding.

In conclusion, I would call attention to the vegetation growing on the various geological formations. Perhaps the most striking illustration of this is seen to the south of the Granite junction in the Werribee River, where a dense growth of *Prostanthera*

lasiantha covers the Silurian, and not a single plant crosses over to the Granite country. Following the junction, the boundary is clearly defined, a dense forest of stunted Stringybark covering the poorer slate country. I was unable to find a single specimen on the Granite soil, over which Casuarina, Yellow Box, Banksia, and Blackwoods are thinly scattered.

I have to thank our fellow-members, Mr. A. J. Campbell for his great kindness in paying the district special visits to obtain the photographs with which these notes have been illustrated, and my brother Tom for help in the field.

[The paper was illustrated by a fine series of limelight views of the various sections, &c. The publication has been delayed for the preparation of a map of the district.—Ed. *Vict. Nat.*]

SOME NORTH-WEST QUEENSLAND BIRDS.

By Wm. Macgillivray, M.B., B.S.

(*Read before the Field Naturalists' Club of Victoria, 11th March*, 1901.)

Thinking that an enumeration of the principal birds from a little-known part of Queensland, together with a short description of their habits and general economy, would be of interest to the ornithological members of the Club, I have put together these notes from information imparted and skins and eggs sent me from time to time by my brother, who has been a resident of the district in question for over thirty years, and have supplemented them in places by my own recollections of eight years spent there over twenty years ago.

The area to be dealt with is that surrounding and especially to the east of Cloncurry, a small mining township situate about 200 miles south of Normanton, the chief port on the Gulf of Carpentaria, and about 150 miles east of the Northern Territory border. The country surrounding the town is hilly and scrubby, becoming more stony and barren as one approaches the ranges to the south and west, which form the watershed between the Gulf rivers and those of the interior system to the east, and in every direction beyond the ranges the country opens out into undulating downs or plains, covered with a luxuriant growth of grass and herbage and intersected at varying intervals of 10 to 20 miles by creeks which run during the rainy season and are dried into waterholes for the rest of the year. There is as a rule no timber on the plains, though the creeks are bordered by a stunted form of eucalyptus, locally known as "coolibah," with bauhinias, acacias, and other bushes and shrubs. Nearer the ranges one finds more scrub, especially of a hard-wooded species of acacia, known popularly as the "giddia" or "gidgee." The climate is dry and warm for the greater part of the year. The

rainy season begins towards the latter end of December and lasts throughout January and February, and it is then that all vegetable growth takes place. The plains become clothed with grasses, and insectivorous, grain-eating, and aquatic birds find food sufficiently abundant to enable them to undertake the duties of rearing their young. Rain occasionally falls during the winter months, but never in any amount, the days being usually dry and warm and the nights cold, but rarely to the extent of frost.

CORVUS CORONOIDES.—The Crow is fairly numerous, building in the trees along the creeks during and after the wet season, but the Raven has not been identified with any degree of certainty.

STRUTHIDEA CINEREA.—The Grey Jumper is occasionally seen, but is more numerous further north and on the Flinders.

CHLAMYDODERA MACULATA.—The Spotted Bower-bird is the usual species met with, and is found near Cloncurry on the scrubbier creeks. The bowers, adorned with the usual heaps of land shells, bones, feathers, and other rubbish, are usually to be found under an overhanging bauhinia or acacia. Any nests found were placed in giddia trees, eggs being laid in January and February.

TÆNIOPYGIA CASTANOTIS.—The Chestnut-eared is by far the commonest and most numerous of the finches all over the district. It is found in flocks of greater or less magnitude along every creek, and its nests are seen in every conceivable situation from the under part of an inhabited nest of the Allied Kite on a high tree to the lowest bush.

EMBLEMA PICTA.—This beautiful little Painted Finch is only met with in the ranges south of Cloncurry.

BATHILDA RUFICAUDA.—The Red-faced Finch shares with Bicheno's Little Finch the honour of coming second to the Chestnut-eared in point of numbers. The Chestnut-breasted, *Munia castaneithorax*, the Black-throated, *Poephila cincta*, and the Gouldian Finch, *Poephila gouldiæ*, are less frequently occurring forms.

MIRAFRA HORSFIELDI.—The Bush-Lark is a songster which evidently finds the long grass of the plains to its liking, as the species is well represented.

CINCLORHAMPHUS CRURALIS and RUFESCENS.—Both these Song-Larks are present.

CLIMACTERIS, sp.—A Tree-creeper, very dark in colour, is commonest in the ranges.

SITTELLA LEUCOPTERA.—The White-winged Tree-creeper is usually found amongst the giddia and box timber, and nests in the wet season.

ENTOMOPHILA RUFIGULARIS.—The eggs of the Red-throated Honey-eater show the same variations noted by Mr. Keartland in the north-west. The nest is an elongated bag-shaped structure,

suspended by its rim from the smaller branches of a prickly acacia, often very low down.

ENTOMOPHILA PICTA.—The Painted Honey-eater is not so numerous as its congener; usually found in the tea-tree along the creeks.

PTILOTIS LEILAVALENSIS.—This Honey-eater is quite a common bird, although comparatively new to science, the type having been sent to me by my brother about two years ago, and kindly described by Mr. A. J. North in the Australian Museum Records last year. Found along all the creeks, haunting blossoming gums and tea-tree, feeding on these and to a certain extent on smaller insects.

PTILOTIS SONORA.—A few specimens of the Singing Honey-eater are to be seen in the scattered timber on the sand ridges and clumps out on the plains.

MANORHINA FLAVIGULA.—This Yellow-throated Minah is very numerous, and have been twice noted by my brother feeding the young of the Koel.

PHILEMON SORDIDUS.—The Little Friar-bird is fairly plentiful in the eucalyptus scrubs about Cloncurry, and nests in April and May.

DICÆUM HIRUNDINACEUM.—The little Mistletoe-bird is quite a common sight in these latitudes, as its favourite food, the berries of the mistletoe, is to be had in abundance. My brother noted that many of these little creatures were drowned in the water-troughs during the dry season.

PARDALOTUS RUBRICATUS.—Several nests of the interesting Red-browed Pardalotes were obtained during July and August.

GYMNORHINA TIBICEN.—Magpies are common, and are no doubt of this species, though eggs are constantly very much smaller than New South Wales or Victorian specimens.

(To be continued.)

ON CERTAIN INCRUSTATIONS ON WOOD IN DUNE SAND.

BY T. S. HALL, M.A.

(With two Plates.)

(*Read before the Field Naturalists' Club of Victoria*, 15*th April*, 1901.)

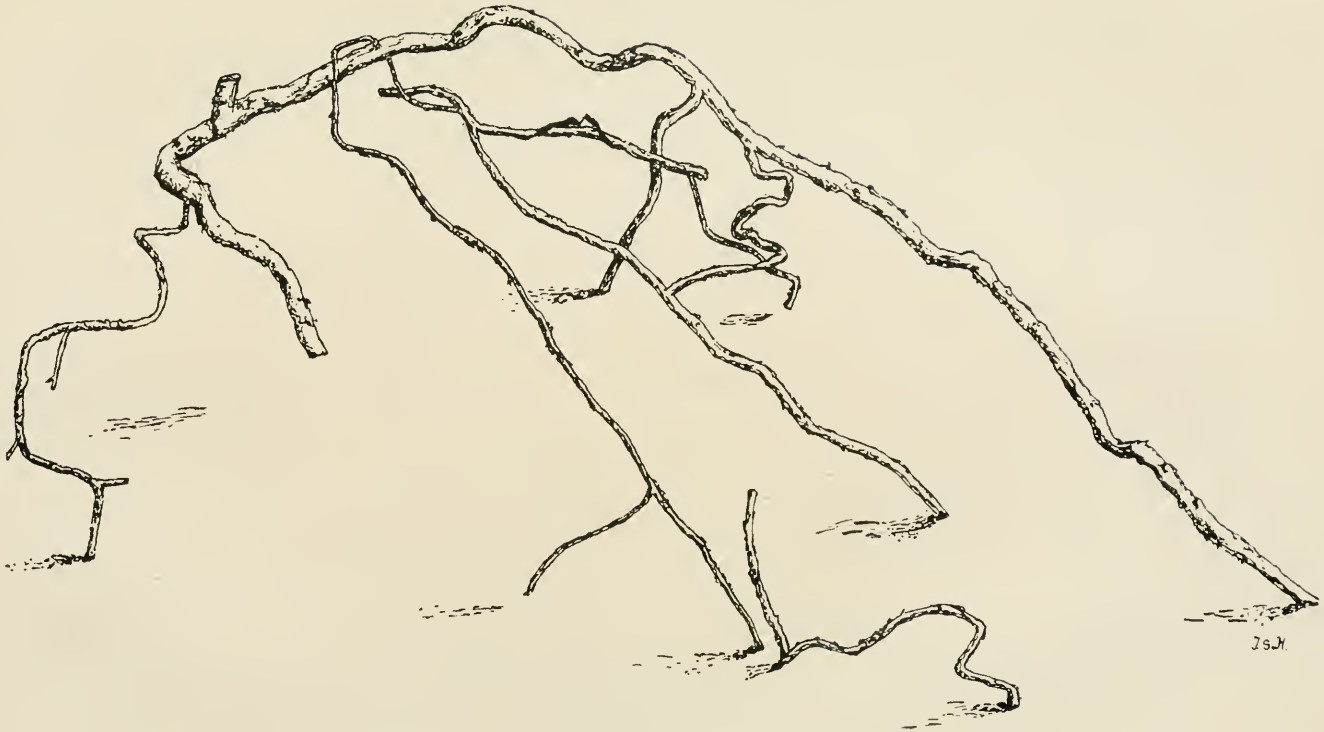
SKIRTING our coast line almost everywhere from the eastern to the western boundaries of the State is an accumulation of blown sand, forming usually rolling dunes, in some places of loose, shifting material, but in others more or less compacted into stone. The width of this fringing deposit varies very much in different places. Generally speaking it fades away gradually in its inland extension, a fact due to its wind-formed nature and seaward

origin. Fresh additions come from the seaward, and close to the coast bare drifting sand dunes are common, while, as we pass inland, vegetation makes its appearance, and we may get the dense scrub-land of the Nepean Peninsula, or the well-grassed, park-like country of Cape Otway or Warrnambool. The boundary of the loose dunes is ever shifting; now they are marching inland, overwhelming roads, fences, and paddocks, as on the coast line near Barwon Heads, where the old road for miles is destroyed, and is now scarcely traversable even on foot, though thirty years ago it was, I believe, a beautiful grassy track. In other places again the line of vegetation has crept seaward to the very cliffs, and the shifting sandy billows have been frozen as by a magic touch. The struggle between shifting sand and plant life is a keen one, and the victory now lies with the one and now with the other; a too rapid advance is here repulsed, and here again there is a steady forward march.

It is with certain phenomena of this shifting border line that I wish to deal at present. Occasionally when the drifting sand is blowing away there are exposed to view thickets of what, at first sight, appear to be petrified stems and roots of shrubs. The nature of these curious bodies has long ago been worked out, for they are not confined to Australian shores, but are found in other parts of the world; but popular misconception as to their nature makes it appear advisable to give some account of them.

In one of his presidential addresses Prof. Ralph Tate tells us that the first recorded geological observation for Australia relates to these pseudo-fossils, for in 1791 Vancouver, who discovered King George's Sound, says that Bald Head was covered with a coral structure, by which he meant the objects in question. Flinders thought they were petrified trees when he saw them about ten years afterwards. In 1836 Charles Darwin visited Bald Head in company with Captain FitzRoy, and his explanation, though not the correct one, is a closer approach to the truth than that of the two previous observers. He says in his "Journal of Researches": — "According to our view, the beds have been formed by the wind having heaped up fine sand, composed of minute rounded particles of shells and corals, during which process branches and roots of trees, together with many land shells became enclosed. The whole then became consolidated by the percolation of calcareous matter, and the cylindrical cavities left by the decaying of the wood were also filled up with a hard pseudo-stalactitical stone. The weather is now wearing away the softer parts, and in consequence the hard casts of the roots and branches of the trees project above the surface, and, in a singularly deceptive manner, resemble the stumps of a decayed thicket."

Jukes, in his "Sketch of the Physical Structure of Australia,"



INCRUSTATIONS ON ROOTS IN DUNE SAND, SORRENTO.

Negative by D. Le Souef. *Process Block by* Triumph Engraving Co.

INCRUSTATIONS ON ROOTS IN DUNE SAND, SORRENTO.

describes similar structures near Fremantle, and ascribes them to "stalactites formed in the sand by the percolation of rain water dissolving and taking up the carbonate of lime found in the sand, and redepositing it in fantastic forms wherever a predisposing cause happened to determine it." This is correct as far as it goes, but it does not go far enough.

Selwyn, in describing the dunes of the Schanck district, quotes Jukes's remarks with approval both as to character and as to mode of formation.

Tenison-Woods, in his "Geological Observations," considered that they had nothing to do with trees, while R. Etheridge, jun., described them, but did not discuss their origin, simply calling them concretions.

Who it was who first divined the true method of their formation I am unable to say, but Moseley* has put the whole thing so concisely that a restatement of the case seems scarcely justifiable, excepting in order to give some slight amplification. In speaking of the sand dunes near Cape Town he says:—"The White Sand is calcareous. As it shifts before the wind it, in many places, buries bushes growing near the shore. These die, and their stems, buried in the sand, decay, and in so doing set free a certain amount of acid, which brings about a solution and a redeposit of calcareous matter in the sand. The sand immediately surrounding the stems is thus cemented into a solid mass, which encrusts the remains of the bark. The wood decays away and a pipe with a wall of cemented calcareous sand is the result. The sand shifting again, these pipes, which are often branched, are left exposed on the beach."

The whole subject of the action of these acids is discussed by Julien† in one of those encyclopædic papers which must always be studied by anyone interested in the weathering of rocks. We shall refer to Moseley's explanation later, and will first consider more closely the nature of the objects and of the rocks in which they occur.

An examination of a series of specimens will show that in almost every instance they are really tubular structures composed in the main of carbonate of lime, which forms a ground mass in which are embedded rounded grains of quartz. The proportion of quartz grains will vary in different localities, and will depend on the nature of the original sand of the dune. At times scarcely any quartz will be visible, but the axial part of the tube will be formed of compact, ringing limestone, which is seen to be composed of concentric coats, and which is denser nearer the axis than towards the periphery. Sometimes the structure is solid, the tube being filled up. Externally the tube frequently

* "Notes by a Naturalist on the Voyage of H.M.S. *Challenger*."

† "Proceedings of the American Association for the Advancement of Science," 1879.

passes quite gradually into the loose dune sand. A little searching among the fragments of the pipes which lie strewn over the surface of the sand will soon be rewarded by finding some specimens in which there loosely lie in the cavity of the tube one or more dried and decomposing roots of a shrub. Which is first, the tube or the root? Was the tube formed round the root, or did the root find the tube ready made and pass down it? This is a question to which we shall return later.

The next point to consider is the nature of the sand of those dunes in which these structures are found. An examination with a hand lens will show that it is very far indeed from being composed entirely of quartz grains, but that a very large proportion consists of small polished fragments of shells and other calcareous organisms, the proportion, it is almost needless to remark, varying with the locality; thus, in some of our Victorian dune sands there is said to be more than 90 per cent. of lime, while at Sorrento a very rough estimate of a sample with the imperfect means at my disposal gave me somewhere about 50 per cent. Mr. W. H. Green, M.Sc., tells me that a piece of the dune rock from Sorrento which he subsequently examined for me contained 48 per cent. of lime.

Speaking in a general way, then, and without fixing our attention on the exact percentage of lime in the tubes, we see that they only differ from the loose sand in the fact that the lime they contain is no longer in the form of separate grains, but is in a solid mass. We must look for something which will dissolve carbonate of lime and redeposit it; and, moreover, as there is such a manifest resemblance in the form of the objects in question to roots, we may point the finger of suspicion at the roots themselves and inquire what they have to do with it. Darwin's explanation was, as is quoted above, that the sand was compacted into rock by the action of percolating calcareous matter, that the roots of the plants decayed and left a cavity which was subsequently filled with lime precipitated from solution. But the pipes occur in loose sand, which would not leave a cavity on the removal of the roots, which is a fatal objection as far as our specimens are concerned. The origin of the percolating calcareous matter is, moreover, left in doubt, and is a question we must discuss. If we consider the products of decomposition set free during the decay of roots, and remember that acids are excreted by roots during life, we shall find that we have an agency at hand which will satisfy all requirements. We know that the roots of a living plant contain an acid sap which is capable of acting on substances with which the cells are in contact; thus a piece of polished marble in a flower-pot will be found to have an imprint of the rootlets etched on its surface. But during decay a still greater supply of acid is set free. Decomposition is in the main a process of oxidation,

and the final products of the slow oxidation of organic material are the same as those produced by its combustion by fire. However, in slow decay a vast number of chemical bodies are formed, one after the other, as more and more oxygen is seized on by the decaying substances, and this decay is—it is hardly necessary to remind you—brought about almost entirely by the action of living bacteria, at any rate in its earlier stages. Amongst these chemical substances is a series of acids called collectively "humic" acids, from their constant occurrence in humus or decaying vegetable matter. Some of these acids have as active a solvent power as the so-called mineral acids, such as hydrochloric or nitric. Amongst them two, crenic and apocrenic acids, stand out in efficiency. Most of the salts that they form are soluble in water, and are in their turn readily oxidized to carbonates and oxides, most of which are insoluble. Thus we have surrounding the roots, both dead and alive, but more especially when dead, a series of substances set free which are capable of completely dissolving the shelly fragments, and on further oxidation of redepositing the lime as carbonate in a compact form. With the complete disappearance of the root the increase of the tube ceases, and a period of decay sets in, brought about by a similar series of changes, or, when the tubes are exposed on the surface, partly by unequal contraction and expansion due to variations in temperature and partly by the carbonic acid in rain water, and once more we get loose sand.

We see, then, that the name "petrified wood," which is popularly applied to these objects, is a misnomer, for in a true petrification the organic material is replaced particle by particle by the petrifying substance. Nor are they casts, as Darwin held, for the root is still there while they are forming, and a cast is made by filling a space left after the removal of an object. That from which a cast is taken is a mould, but as one of their essential characters is their structural difference from the loose sandy matrix in which they lie the term mould or impression is inapplicable. The term incrustation, which I have used, and which is implied in Moseley's explanation, is in itself open to objection, since we generally understand that an incrustation is closely applied to the incrusted object, whereas in the present case a zone of non-indurated material often surrounds the root. Again, it does not seem right to apply the term concretion, for the material composing a concretion is collected from the neighbourhood and concentrated at a given spot by what the wise term concretionary action, and we have no evidence of concentration in the present case. However, the least objectionable term seems to be the one adopted, namely, "incrustation," and moreover it is one which most nearly suggests the method of formation of these objects, which are so frequent a source of wonder to the seaside holiday-maker, and which are generally spoken of as petrified trees.

The reproduction of the photograph, kindly lent me by Mr. D. Le Souëf, shows the roots of living shrubs laid bare by the drifting of the sand, and also, at a lower level, the incrustations. The other plate is from a sketch of a branching, slender specimen in which the resemblance to roots is unmistakable.

Australasian Ornithological Union.—A meeting of gentlemen interested in ornithology was held at the residence of Dr. C. Ryan, Collins-street, on Wednesday evening, 12th June, the outcome of the gathering being the formation of an organization under the title of the Australasian Ornithological Union, among the chief objects of which will be to collate and disseminate up-to-date information relating to the avifauna of Australasia, and to secure protection to useful birds from ruthless destruction. At the meeting it was announced that their Royal Highnesses the Duke and Duchess of York had signified their willingness to become patrons of such a society in the event of its formation. In connection with the union a periodical, to be called the *Emu*, will be published, in which will appear from time to time scientific papers dealing with subjects of special interest to members. Provisional appointments to office were made as follow:—Committee: Colonel Legge (Tasmania), Mr. J. W. Mellor (South Australia), Dr. C. Ryan and Mr. G. A. Keartland (Victoria); secretary, Mr. D. Le Souëf; treasurer, Mr. R. Hall; joint editors, Messrs. A. J. Campbell and H. Kendall. Rules and regulations for the government of the organization were adopted, and it was determined that the first general meeting of members should be held at Adelaide in October next. Already some 60 gentlemen resident in the various States of the Commonwealth, and others living in New Zealand, have expressed readiness to become members of the union.—*The Melbourne Age.*

Australian Birds at the Crystal Palace.—Aviculture is apparently growing apace in Britain, where Australian birds are particular favourites. At the Crystal Palace Bird Show, held last February, in the Grass-Finch and Mannikins class White-eared Grass-Finches, *Poephila leucotis*, and Black-ringed Finches, *Stictoptera annulosa*, secured second and third prizes respectively. In the Parrakeet class a female of the Golden-shouldered Parrakeet, *Psephotus chrysopterygius*, took second prize, the fourth falling to a Red-shouldered Grass-Parrakeet, *Neophema pulchella.* In the class devoted to all species not provided for in the schedule, the first three prizes fell in the order mentioned, viz.—Regent-bird, *Sericulus melinus;* Masked Wood-Swallow, *Artamus personatus;* Sacred Kingfisher, *Halcyon sanctus.* The *Avicultural Magazine* remarks that the first two of these birds were absolutely faultless, but the last looked rather sad in its confined quarters.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 8th July, 1901. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 40 members and visitors were present.

REPORTS.

A report of the Club's visit to the National Museum on Saturday, 15th June, was given by Mr. J. A. Kershaw, F.E.S., who acted as leader on the occasion. He stated that some time was spent in looking over the Museum Library and examining many of the rare volumes it contains—an opportunity which most of those present had not had before. The galleries were then visited, when the leader briefly pointed out the arrangement of the collections in the main hall. The large collection of mounted specimens temporarily stored in one of the galleries was inspected, in which were noted a beautiful specimen of Grevy's Zebra, *Equus grevyi*, the largest and most recently discovered species; a very fine Kiang or Tibetan Wild Ass, *Equus hemionus*, from Ladak, in Tibet; and a pair of the delicate little Klipspringers, *Oreotragus saltator*, from South Africa—all recent additions. The collections on the ground floor were next visited, and the fine groups of Black Swans, Lyre-birds, and Native Companions, each arranged with their natural surroundings, and in all stages from the egg to the fully adult birds, were specially admired, as was also the attractive group of Regent Bower-birds, with the bower, &c., in its natural position. The afternoon, however, proved much too short to permit of more than a hurried glance at the majority of the specimens exhibited.

The hon. librarian reported the receipt of the following donations to the library :—"Nests and Eggs of Australian Birds," by A. J. Campbell, from the Government; *Queensland Agricultural Journal*, June, 1901, from the Department of Agriculture, Brisbane; pamphlets on various subjects from Department of Agriculture, Sydney; *Knowledge* and *Science Gossip* for June, 1901, from the proprietors.

CORRESPONDENCE.

From the Inspector of Fisheries (Department of Ports and Harbours), replying to a letter from the secretary of the Club regarding an alteration in the close season for Quail, and stating that the question will shortly receive attention.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Clifton Brown, Wesley College, was duly elected an ordinary member, and Mr. F. P. Dodd, Warburton-street, North Ward, Townsville, Queensland, a country member.

GENERAL BUSINESS.

Mr. G. A. Keartland, referring to the alteration desired in the *Game Act*, thought that a committee representing the Club, sportsmen, dealers, &c., should be appointed to confer together and furnish a report on the question to the Minister before any alteration is made in the existing Act. He stated that both quail and ducks were shot during the breeding season. After considerable discussion, in which Mr. Keartland's remarks were supported by Messrs. Le Souëf, Barnard, Mattingley, and R. Hall, it was moved by Mr. G. A. Keartland—"That steps be taken to form a committee representing the various interests of naturalists, dealers, sportsmen, and agriculturists to draw up suggestions for the assistance of the Minister before any alterations are made in the existing *Game Act*." This was seconded by Mr. D. Le Souëf, and carried.

Mr. F. Wisewould moved—"That Messrs. G. A. Keartland, D. Le Souëf, and R. Hall be appointed to represent the Club on the Committee." Seconded by Mr. O. A. Sayce, and carried.

Mr. F. G. A. Barnard, at the instance of Mrs. Martin, drew attention to the neglected state of the fence surrounding the giant tree at Neerim, Gippsland. Four acres had been reserved by the Government to preserve this tree from damage, but the fence has fallen into disrepair. Mr. Barnard thereupon moved—"That the Lands Department be communicated with, and attention drawn to the neglected state of the fence, and ask that it be repaired." This was seconded by Mr. G. A. Keartland, and carried.

Mr. F. G. A. Barnard took occasion to hand over to the president, as a present to the Club, another framed record, prepared by himself, containing a copy of the programme and the autographs of all the members present at the musical reunion held on the 25th June last to celebrate the 21st anniversary of the Club.

The president said he had very great pleasure in accepting this, the second valuable present from Mr. Barnard to the Club, and, in thanking him on behalf of the Club, said that it, together with the record of the office-bearers presented at the anniversary meeting, would be looked upon in the future as valuable mementos of the past history of the Club, and moved—"That a vote of thanks be accorded Mr. Barnard for his valuable gifts to the Club," which was carried by acclamation.

PAPERS.

1. In the absence of Mr. J. G. Luehmann, F.L.S., his paper on "Some New Australian Plants" was postponed.

2. By Mr. T. S. Hall, M.A., entitled "A New Burrowing Fish." The author gave an interesting description of the curious habit of a small freshwater fish from Tasmania, belonging to the genus Galaxias, which was found lying in damp earth, several inches below the surface. This peculiar burrowing habit among fishes had not been recorded before, either from Victoria or Tasmania. A fish belonging to the same family (Galaxidæ) but to the genus Neochanna, had however been met with in New Zealand by gold-diggers in almost dry diggings, and when placed in water had swum about, on some occasions living for several days. Unfortunately only a single specimen, in poor condition, of the Tasmanian form had been received. Some discussion followed, in which Messrs. Le Souëf, Keartland, Barnard, Coghill, Kershaw, J. Stickland, and Sayce took part.

An apology was received from Mr. H. T. Tisdall, stating his inability to be present to read the joint paper by himself and Mr. C. C. Wallis, entitled "A Botanical Trip to Emerald."

NATURAL HISTORY NOTES.

The president, Mr. T. S. Hall, M.A., mentioned the discovery of the fossil remains of a new mammal at Table Cape, Tasmania, and which had been recently described by Professor Spencer, F.R.S.

Mr. F. G. A. Barnard drew attention to a statement in an article on "Canadian Life" in a recent issue of the *Leisure Hour*, in which it was stated that the principal fur used in Manitoba was that of the Australian Wombat, and thought the statement rather remarkable. In a short discussion which followed Mr. A. Mattingley stated that the skins of the Koala or Native Bear were exported from Victoria as "Wombats';" and Mr. D. Le Souëf, C.M.Z.S., stated, as a somewhat singular fact, that hundreds of Native Bears had been killed this winter by the severe cold.

Mr. R. Hall mentioned that a specimen of the Lesser Golden Plover, *Charadrius dominicus*, Müll., had been shot in the bay last month (June) by Mr. C. Smart.

EXHIBITS.

By Mr. C. French, jun.—Life-history of destructive moth, *Pinara nana*, from Western Port, Victoria. The caterpillar of these moths caused considerable damage to young fruit trees in the Somerville district during October, November, and December of last year.

By Mr. T. S. Hall, M.A.—A burrowing fish, Galaxias, sp., from Tasmania, in illustration of his paper.

By Mr. T. S. Hart, M.A.—Calcite, aggregates of crystals (mainly rhombohedra) in basalt, from Ascot mines, near Ballarat.

By Mr. J. Stickland.—Specimens of the freshwater algæ *Pandorina morum*, under the microscope.

By Mr. F. Wisewould.—Land shells from Queensland, including *Papuina mayana*, new to science.

After the usual conversazione the meeting terminated.

SOME NORTH-WEST QUEENSLAND BIRDS.

(Continued.)

By Wm. Macgillivray, M.B., B.S.

(*Read before the Field Naturalists' Club of Victoria*, 11*th March*, 1901.)

Cracticus.—Two species of this genus are common.

Pachycephala rufiventris.—The loud and pleasant note of the Rufous-breasted Thickhead is a familiar one in the gidgee scrubs; it is a little smaller than the Victorian bird, and has that faded appearance which has been mentioned as characteristic of many Northern species. It nests in January and February.

Wood-Swallows are quite common, the Black-faced, *Artamus melanops*, being the prevalent species, the White-browed, Masked, and Little being nearly as numerous.

Acanthiza chrysorrhoa.—Skins, nests, and eggs of the Yellow-rumped Tit are like Victorian specimens in every respect, and the birds are equally as common.

Ephthianura tricolor and E. aurifrons.—Both species of chat are common during the rainy months, when they breed amongst the saltbush of the billabongs or any stunted scrubs.

Lalage tricolor.—Judging by the numbers of the White-shouldered Caterpillar-eater eggs in collections from the Gulf, that part of Australia would seem to be specially favoured as a breeding haunt.

Micrœca pallida.—This little bird is a smaller and paler edition of our own well-known Fly-catcher. Its habits are very similar; it may often be seen on stumps or fence posts, sallying forth at intervals to capture some luckless insect; its nest, however, is somewhat more substantial, and eggs very like but smaller than those of *M. fascinans*.

Petrœca bicolor.—The Hooded Robin frequents the giddia, where its nest may be found in October and November. Mr. North, to whom I submitted a skin, states that "it is smaller than average New South Wales and Queensland skins, but not so small as Gould's *M. picata*, the bill being comparatively larger." The eggs are decidedly smaller than Victorian ones, but are otherwise similar.

Malurus.—Two wrens frequent the polygonum and under-

growth of the creek banks—a red-backed one, possibly *M. dorsalis*, and another which I take to be *M. lamberti*.

RHIPIDURA TRICOLOR.—This familiar Fan-tail is seen around almost every homestead. Both the bird and its eggs are smaller than Victorian examples, but are in every other respect identical. I have distinct recollection of some epidemic killing off nearly all these little birds on the downs country during one autumn. They first became unable to fly, and then, becoming weaker, gradually died in the course of a day or two.

LAGENOPLASTES ARIEL.—The Fairy Martin, the principal representative of the swallows, is never very numerous.

MICROPUS PACIFICUS.—The White-rumped Swift is usually seen for a time during the wet season, and the Blacks, seeing it always on the wing, are firmly convinced that it is a bird without legs.

EUROSTOPUS ARGUS.—The Spotted Nightjar is most often met with amongst the spinifex and stones of the ranges, where it is tolerably common.

ÆGOTHELES, sp.—Examples of this genus have been noted only, but not handled, so that the species could not be determined.

PODARGUS PHALÆNOIDES.—The Freckled or Moth-plumaged Frogmouth is a bird whose mournful moaning call—very like that of the Victorian representative—and general appearance has impressed the Blacks with a belief that it is a child of the Evil One, or, as they term that mysterious creation of superstition and ignorance, the "debbil-debbil." The nest is generally constructed in December, and usually contains a clutch of two eggs, although my brother once took four from a nest in a tree only a few yards from his house.

EURYSTOMUS AUSTRALIS.—The noisy Dollar-bird is quite a common spectacle all over the district.

MEROPS ORNATUS.—Bee-eaters remain throughout the year, and nest in October and November. A very favourite food is a white butterfly, the imago of a processional caterpillar.

HALCYON SANCTUS.—The Sacred Kingfisher, its red-rumped congener, and Leach's Jackass look after the interests of the Kingfishers.

CUCULUS PALLIDUS.—The Pallid Cuckoos are present during the spring and summer months.

EUDYNAMIS CYANOCEPHALA.—The Koel arrives with the first summer rains, generally about the end of December, and does not take its departure until about May.

SCYTHROPS NOVÆ-HOLLANDIÆ.—The Channel-bill arrives and departs about the same time as the former bird, and both are fairly numerous. Crows (*C. coronoides*) are the usual foster-

parents chosen, and have often been noted feeding sometimes one and at other times a pair of young cuckoos.

CENTROPUS PHASIANUS.—The Coucal, once very numerous, is now becoming scarce. It is a very handsome bird, and its peculiar call once heard can never be forgotten.

PTILOSCLERA VERSICOLOR.—The handsome Varied Lorikeet frequents the bloodwoods (eucalypts) when in flower.

CALYPTORHYNCHUS.—A Black Cockatoo is often seen in the scrubs near Cloncurry.

CACATUA GALERITA and ROSEICAPILLA.—The White and Rose-breasted Cockatoos are well-known residents, and breed along the creeks in the larger gum trees.

C. SANGUINEA.—The Blood-stained Cockatoo, which seems to be quite indistinguishable from the Bare-eyed, *C. gymnopsis*, is in point of numbers the commonest cockatoo in the Gulf district, and, in fact, in all the western border of Queensland, coming as far south as the neighbourhood of Broken Hill, in New South Wales, where it breeds yearly and is fairly numerous. In the Gulf they nest during the wet season, the usual clutch being three, placed, like those of other cockatoos, in the hollow spout of a tree—most often one of the stunted coolibahs which line the watercourses. I do not know of a more mischievous bird. They go about in immense flocks, and usually commence the day by flying out at sunrise on to the downs to feed for about two hours upon seeds and a small bulbous plant, which grows in patches, and which they dig up. They then fly in together to the creek, and take possession of two or three unfortunate trees—unfortunate because they amuse themselves by biting off all the leaves, smaller twigs, and stripping off bark until the trees are left quite bare, when they go to some other. This amusement is kept up until late in the afternoon, when they all fly off on to the plain for another meal, coming in just before dusk to roost.

CALOPSITTACUS NOVÆ-HOLLANDIÆ.—The Cockatoo Parrakeets are more numerous some seasons than others, and they usually nest after the winter rains.

PTISTES ERYTHROPTERUS.—The Red-winged Lory occurs in twos and threes, and may often be seen feeding on the bell-shaped, honey-laden flowers of the bauhinia, a tree that sheds most of its leaves before flowering in early spring.

MELOPSITTACUS UNDULATUS.—The Warbling Grass-Parrakeets, though common at all times, come in enormous numbers when conditions are unfavourable elsewhere. I well remember one breeding season when they were in such numbers along the scantily timbered creeks that all ordinary holes and spouts soon became occupied, and the birds had recourse to hollow logs on the ground, where they nested side by side along the entire

length, all stages, from fresh eggs to young birds, being seen in the same log.

GEOPELIA CUNEATA and G. TRANQUILLA.—Of these two doves the former is the commoner, its frail little nest being often seen in low bushes and shrubs in the spring, and later on again in the early autumn months.

HISTRIOPHAPS HISTRIONICA.—The Flock Pigeon was for many years more numerous than any other bird inhabiting the fertile downs of the Gulf country. Twenty years ago it was no uncommon sight to see these birds flying in to water in an unbroken succession of mobs from fifty to several hundreds each for two hours or more at a time from the plains in all directions. Nothing could be heard near the waterhole but the clatter and whirr of wings as each mob alighted near the water, each bird running down to the edge, dipping its bill once or twice, and then off again to the plains for the night. I have frequently taken this bird's eggs over twenty-five years ago when resident in the district. The Flock Pigeon is essentially a ground bird, never perching.

(To be continued.)

A NEW VICTORIAN COCCID.

By JAMES LIDGETT.

(Communicated by F. G. A. Barnard.)

(*Read before the Field Naturalists' Club of Victoria, 20th May,* 1901.)

LECANIUM AUSTRALIS, sp. nov.

Adult female naked, brown in colour, with several blotches of lighter ground colour or nearly yellow scattered irregularly over the dorsum, and occupying about half of the area of that region; ventral surface yellowish, concave, and usually crowded with scores of young larvæ. In shape semi-globular, with several longitudinal rather deep furrows, which give the dorsal region a ridged appearance. Along these furrows are placed some shallow depressions, in which the spiracles are situated. These are rather large, and bivalvular in shape, with immense tracheæ. Mentum monomerous; rostral setæ long and coiled; dermis chitinous, with many scattered triangular gland-spots; marginal spines entire, but very small; abdominal cleft distinctly lecanid, lobes rather large; antennæ and feet entirely wanting. Diameter of insect averaging ¼ in.

Larva elliptical, flattish, and may always be found occupying the ventral region of the adult; antennæ six-segmented, the second being the longest, the rest sub-equal, each bearing several stout hairs; feet long and slender, coccæ longer than trochanter, tibia much shorter than femur, claw large; tarsal digitules fine hairs, claw digitules filiform; spiracular depressions shallow, and bearing some fine hairs. Length of insect about $\frac{1}{25}$ in.

Adult male unknown.

Hab.—In Victoria on *Acacia implexa*, Bentham. Specimens collected at Myrniong in January, 1898.

This species resembles in habits *Lecanium casuarinæ*, Mask., inasmuch as specimens were found inhabiting the borings of various lepidopterous and coleopterous wood-feeding insects, so that it would be impossible to discover them without splitting the branches into pieces. The presence of ants in great numbers entering the tunnels is a certain indication of their whereabouts, and is probably the only means of discovering them.

Externally it is not unlike *casuarinæ*, but is smaller and differs in the lobes and rostral setæ, as well as in the colouration of the dorsal region. It may possibly only be a variety of *casuarinæ*, and I would have been inclined to consider it as such only for the following note from the late Mr. Maskell:—"Your No. 48 is sp. nov. It is a Lecanium, very near to No. 38, which I have named, after the host plant, *casuarinæ*. It is very interesting to find two insects occupying similar positions so much alike."

A NEW SPECIES OF OWLET NIGHTJAR.

By Robert Hall.

(*Read before the Field Naturalists' Club of Victoria*, 10*th June*, 1901.)

Two specimens of an Owlet Nightjar (Ægotheles) have recently been forwarded to me from the Fitzroy River, North-West Australia, by Mr. J. P. Rogers. On examination they proved to be adult birds, male and female, and to differ considerably from previously described members of this genus, being nearest in agreement with *Æ. albertisi*, Sclater, from New Guinea. The distinguishing characters are:—The chestnut-rufous on the back of the male is uniform, while that of the female is faintly barred with black; the wings and tail are almost completely marked with strong rufous, vermiculated with dull blackish-brown, while the nuchal collar is complete. The female is slightly duller than the male. The rictal bristles of the male and female are larger than in the *Æ. novæ-hollandiæ*, and there are about one-third more bars upon the central tail quills of each sex.

The bird is evidently undescribed, and I propose to name it *Ægotheles rufescens*, the Rufous Nightjar, and append a detailed description of the male. The type specimens will be deposited in the National Museum, Melbourne.

Ægotheles rufescens, sp. nov.

Adult male.—General appearance rufous; forehead rufescent; head and nape black, with a large amount of rufous on the lateral portions; collar on hind-neck white, washed at the edges of feathers with tawny, complete, and blending with same colour on chest; whole of back chestnut-rufous and uniform; upper tail coverts rufous and barred; central pair of rectrices

chestnut rufous, with blackish-brown bars, the remaining ones having their inner webs with the bars obsolete at the distal end; under surface of tail paler; shoulder and lesser wing coverts chestnut-rufous; outer webs of primaries bright rufous, with blackish-brown bars, inner webs uniform earthy-brown; secondaries rufous, with pale vermiculations; under surface of quills much paler than upper; under wing coverts tawny white; chin whitish; throat, chest, and breast white, flushed with tawny, and faintly arrowhead barred, except on breast; abdomen, flanks, and under tail coverts white; lores creamy white; cheeks creamy white on proximal half, rufous on distal; upper mandible at base flesh-colour, shading into brown at tip; culmen blackish-brown; irides brown; legs and feet browny cream. Total length, 9.5 inches; wing, 5 inches; tail, 5 inches; tarsus, 0.8 inch; bill, from gape to tip, 1 inch.

Habitat.—Derby, North-West Australia.

EOCENE DEPOSITS AT MOONEE PONDS.

By G. B. Pritchard,

Lecturer on Mineralogy, &c., Working Men's College, Melbourne.

(*Read before the Field Naturalists' Club of Victoria, 10th June*, 1901.)

In 1896 Mr. T. S. Hall and myself contributed a paper to the Royal Society on the Tertiaries in the neighbourhood of Melbourne, which showed pretty conclusively that fossiliferous localities are fairly common and distributed over a wide area within easy reach. The prevailing character of the out-cropping Tertiary deposits in this area is ferruginous sands, sandstones, grits, gritstones, and occasional conglomerates; and in hunting for fossils it is usually the finest-grained material that yields the best results, both in number and preservation of specimens. But the coarser materials must in no way be overlooked, for sometimes very fair specimens can be obtained at localities of the utmost importance from a stratigraphical point of view. Too much care cannot be taken in collecting fossils around Melbourne, and it is not sufficient to know that all the specimens obtained came from the same locality, but they must be taken from the same bed or level. This precaution is necessary as there are at least two distinct palæontological zones, though there may be practically no lithological difference in the rock in which the fossils occur. I might, perhaps, here include the names of a few of the commoner fossils that can be collected from each of these horizons.

From the upper beds, which have been referred to as Miocene on account of the fossils showing a close agreement with beds of that age at Muddy Creek and other typical localities in the

colony, the following species are the commonest :—*Leiopyrga quadricingulata*, Tate ; *L. sayceana*, Tate ; *Terebra catenifera*, Tate ; *Latirus approximans*, Tate ; *Natica cunninghamensis*, Harris ; *Leda acinaciformis*, Tate ; *L. crassa*, Hinds ; *Nucula tenisoni*, Pritchard ; *Dosinia johnstoni*, Tate ; *Myadora corrugata*, Tate ; *Mactra hamiltonensis*, Tate ; *Zenatiopsis angustata*, Tate ; *Barnea tiara*, Tate ; *Chione subroborata*, Tate ; *Meretrix paucirugata*, Tate.

From the lower beds, which have been referred to as Eocene on account of the common fossils being the prevailing forms found in such typical localities as Muddy Creek and Balcombe's Bay, Mornington, usually regarded as of that age, the following may be mentioned :—*Dimya dissimilis*, Tate ; *Lima bassii*, T. Woods ; *L. linguliformis*, Tate ; *Spondylus pseudoradula*, M'Coy ; *Barbatia celleporacea*, Tate ; *Chione cainozoica*, T. Woods ; *Chama lamellifera*, T. Woods ; *Lyria harpularia*, Tate ; *Nassa tatei*, T. Woods ; *Conus ligatus*, Tate ; *Trivia avellanoides*, M'Coy ; *Semicassis sufflata*, T. Woods ; *Tenagodes occlusus*, T. Woods ; *Turritella murrayana*, Tate ; *Bathytoma rhomboidalis*, T. Woods.

The use of the terms Eocene and Miocene is not intended to necessarily mean exact contemporaneity with deposits of that age in Europe, but it has been found convenient to refer to our deposits under those names, as judging from their molluscan contents there seems a sufficiently marked removal from present time to permit of them being regarded as representing our early Tertiary time.

These remarks I make with the object of putting all collectors on their guard, and of indicating that the various Tertiary outcrops around Melbourne must have their relative age determined upon their fossil contents, and in the absence of fossils no definite opinion on the age can be expressed.

Some short time ago a new drain was put in under the Essendon railway line at the head of Athol-street, a short distance on the Ascot Vale side of the Moonee Ponds railway station. The bottom of the excavation for the drain went into decomposed older basalt, and in the ferruginous sandy rock immediately overlying numerous casts and impressions of fossils could be obtained. A collection of these specimens was made by Mr. D. W. Paterson, a student at the Working Men's College, and he kindly allowed me the opportunity of making a close examination, with the result that the following identifications have been made :—*Aturia australis*, M'Coy ; *Haliotis nævosoides*, M'Coy ; *Liotia roblini*, Johnston ; *Dentalium mantelli*, Zittel ; *Calliostoma*, sp.; *Cypræa*, sp. ; *Patella*, sp. ; *Cerithium flemingtonensis*, M'Coy ; *Latirus*, sp. ; *Barbatia celleporacea*, Tate ; *Barbatia simulans*, Tate ; *Cucullæa corioensis*, M'Coy ; *Spondylus pseudoradula*, M'Coy ; *Dimya dissimilis*, Tate ; *Limatula jeffreysiana*, Tate ; *Chama*

lamellifera, T. Woods ; *Corbula pixidata*, Tate ; *Placunanomia*, sp. ; *Pectunculus*, sp. ; *Magellania garibaldiana*, Davidson. Also polyzoal remains and cidaroid spines are fairly abundant, and what appears to be remains of woody fragments. An inspection of the above list will suffice to show that the lower portion of this deposit at any rate may be referred to Eocene. Lithologically there does not seem any marked indication of difference in character in the outcrop at the top of the railway cutting, but a few obscure impressions in the higher portion render it necessary that very careful collecting should yet be done at this spot, in order to prove more conclusively than the present material will permit the existence or absence of the upper or Miocene beds. One incomplete specimen appears to indicate the presence of *Leda crassa*, Hinds, and another, *Mactra hamiltonensis*, Tate, but before making absolute identifications I should like more material. This adds another important link in the chain of fossiliferous localities previously recorded.

ON A NEW ZEOLITE (MOORABOOLITE).

By G. B. Pritchard,

Lecturer on Mineralogy, &c., Working Men's College, Melbourne.

(*Read before the Field Naturalists' Club of Victoria*, 10*th June*, 1901.)

During the course of several visits to the Moorabool Valley, in the neighbourhood of Maude, for geological investigations, a fairly common mineral has usually been obtained, which upon critical examination proves to be worthy of being regarded as a new variety, and which I propose to call Mooraboolite.

This mineral is evidently derived from the decomposed older basalt, for numerous specimens can be readily procured on the basaltic and sub-basaltic slopes. At first sight one might easily mistake this mineral for Arragonite on account of its occurrence, appearance, and usual radial rosette form. In fact, it seems pretty certain that this mistake has already been made by the members of the Geological Survey and by Mr. T. S. Hall and myself. In the first place it may be noted that on Geological Quarter-sheet 19, S.W., surveyed by Messrs. C. S. Wilkinson and R. A. F. Murray in 1865, a note is printed over the area where the present mineral was found—"Older basalt, containing Arragonite." Mr. Hall and I, on finding the mineral, incautiously accepted the note on the geological map, and until a short time ago made no independent tests to confirm it, so that in a paper written by us on the Older Tertiaries of Maude, and read before the Royal Society in 1894, the following remarks were made :—"The older volcanic rock in the district is much decomposed, and towards its upper part is full of amygdules of carbonate of lime, while some lumps

of radiating crystals of Arragonite, about half a pound in weight, were found on the slopes." The records above indicated are also referred to by Mr. J. A. Atkinson in his "Locality List of Victorian Minerals;" hence, in view of the present communication, it seems necessary that these records should be cancelled.

The first suspicion that the mineral was not Arragonite came from a test of its hardness, this feature being altogether too high for that mineral; then a more critical blowpipe examination proved undoubtedly that the mineral was a Zeolite belonging to the Natrolite group.

Description.—Mineral opaque white, to clear, transparent, and glassy; lustre vitreous where distinctly crystalline, but silky where opaque and fibro-crystalline; streak, white; hardness, 6; specific gravity, 2.167 to 2.17; tenacity, in mass tough, in splinters brittle; fracture, splintery; fusibility, 3.5; form, more or less hemispherical rosettes, ranging from about an inch to more than three inches in diameter, composed of radiating crystals. The greater portion of these rosettes is opaque milky white, but near the outer circumference the glassy crystals become distinct. The system of crystallization is rhombic, and the common form hitherto identified consists of a combination of an elongated right rhombic prism with a squat right rhombic pyramid for termination. No cleavage apparent, but the crystals commonly show an uneven transverse fracture.

Composition.—Essentially a hydrated silicate of alumina, soda, and potash, with a little lime. The exact analysis—for which I am much indebted to Mr. E. O. Thiele, my assistant at the Working Men's College—is given below, and I take this opportunity of thanking that gentleman for his trouble, for without his assistance in this respect this paper would have been delayed for some considerable time.

$Si\,O_2$	...	...	48.024	per cent.
$Al_2\,O_3$	...	...	28.684	„
$Ca\,O$	...	...	0.42	„
$Na_2\,O$	...	...	11.239	„
$K_2\,O$	...	...	3.001	„
$H_2\,O$	...	...	9.8	„
			101.168	

Blowpipe Characteristics.—Flame colouration indicating sodium, with cobalt glass the potassium flame is very distinctly seen; in the tubes the mineral becomes opaque white, losing its lustre, and yields water without intumescence, and the residue is easily crushed between the fingers to powder; on charcoal alone the mineral in small fragments fuses slowly, its fusibility being above that of Garnet but lower than Actinolite—the fusion is

accompanied by a slight bubbling, and the fused mass is at first opaque white, but becomes a clear, transparent glass; in the candle-flame alone opaque splinters become glassy, but do not fuse even on the edges, before the blowpipe fuses fairly easily, first to an opaque globule, then to a clear glass on continued blowing.

On a first glance at the composition of this mineral one is inclined to think it is only Natrolite. Close investigation of characters, as well as composition, will, I think, show a sufficient number of distinguishing features to warrant the present introduction of a new varietal name.

The composition of ordinary Natrolite, based upon several analyses, may be given as follows :—

$Si\ O_2$	...	...	45.74 to 48.63 per cent.
$Al_2\ O_3$	...	...	24.82 to 28.38 ,,
$Ca\ O$	...	...	0 to 0.41 ,,
$Na_2\ O$	...	...	13.87 to 16.99 ,,
$K_2\ O$	...	...	0 to 1.16 ,,
$H_2\ O$	...	...	9.42 to 10.5 ,,

In the varieties Galactite and Fargite the only difference appears to be an increase in the percentage of lime up to about 4 per cent., while other forms show the presence of small percentages of $Fe_2\ O_3$, $Fe\ O$, $Mn\ O$, and $Mg\ O$. The most striking feature of difference in the composition of the new variety is therefore the relatively high percentage of potash, and consequently the low proportion of soda, but associated with this difference there is the difficulty of fusion, which certainly does not appear to be accounted for by the composition, and other features in its behaviour under the usual blowpipe tests.

A BURROWING FISH (GALAXIAS, SP.)

By T. S. Hall, M.A.

(*Read before the Field Naturalists' Club of Victoria, 8th July*, 1901.)

The occurrence in Tasmania of a burrowing species of Galaxias is of decided interest, especially in view of the similar habit of the allied New Zealand genus, Neochanna.

Early in March Mr. Russell Ritchie, of Launceston, sent me, through Dr. J. F. Barnard, a single specimen of a fish, together with a note, the substance of which is as follows :—The specimen was dug up at Strahan in February of the present year. It was found in "decayed peat and sand," eight inches below the surface. There was no water, but the soil was moist enough to harbour worms. When placed in water it swam freely, but at intervals of half a minute or so it came to the surface, ostensibly

to breathe. The eyesight was good. Fish are reported as being occasionally dug up in the "button-grass country" on the west coast of the island, and are stated by a miner to have no eyes, though otherwise similar. That the fish are by no means rare is shown by the fact that twelve were recently dug up from the same locality at Strahan, and lived in a pickle bottle in water for various periods up to three days.

This is all explicit enough, and the fact that the fish burrows and is quite healthy when taken out of the soil seems, on the clear evidence supplied, to be beyond cavil. As regards its identification, it is clearly a Galaxias, but as only a single specimen, hardened and shrunken by strong spirits, is available, its specific determination must stand over. It is a slender form and is marked by chevron-shaped dark bands of small spots, which mark out the myotomes in the middle of the body, but become irregular towards the head and tail. Its total length is 44 mm.

The burrowing genus from New Zealand, Neochanna, has no ventral fins and but a rudimentary eye.* It habitually lives deeply buried in mud, but soon dies when placed in clean water.

The family Galaxidæ, containing only the two genera mentioned, is an Antarctic one, and occurs in all southern lands where physical conditions do not forbid its existence, and it is interesting to find that two members of the group should have the same habit, though in the New Zealand form the absence of ventral fins, a character common in burrowing fish, points to its earlier acquirement and a more persistent adoption of it.

The question that naturally suggests itself is—Is this the only Galaxias that burrows, or do some of our continental forms behave in the same way? It is quite possible that we do have burrowing forms here, and the fact is also likely to escape notice, since digging in swampy land is not a pastime which generally commends itself to people. Now that attention is directed to the fact, it is probable that attempts will be made to settle this point, and it is one deserving of attention.

BOOK NOTICE.

NESTS AND EGGS OF BIRDS FOUND BREEDING IN AUSTRALIA AND TASMANIA. By Alfred J. North, C.M.Z.S., Ornithologist, Australian Museum, Sydney.

THE first part of this work, which is published by the Trustees of the Australian Museum, Sydney, is to hand, having been issued on 15th June. It is termed "Special Catalogue No. 1," and is really a second edition of the "Museum Catalogue, No. XII.," but has been so altered in style and almost rewritten that it may be considered a new work. The advent of this part

* "The Fishes of New Zealand," by F. W. Hutton, F.R.S., &c., p. 130.

had been long expected, and even now contains fewer pages than originally intended, owing to some disappointment as to the supply of paper of the requisite quality. The size adopted, quarto, admits of plates and illustrations being on a larger scale than in the previous edition. The part under notice commences with the order Passeres, and deals with fifteen species belonging to the families Corvidæ and Paradiseidæ. The general plan adopted is—following the Latin name of the bird is given its vernacular name, then the various synonyms and references, descriptions of the adult male and adult female, and distribution through the different geographical (or political) areas of Australia. Then follow general notes from various sources as to habits, food, nesting, &c., concluding with the description of the nest and eggs. Speaking of crows and ravens, which years ago were frequently seen in large flocks near Melbourne, but of late seem to have deserted the suburban districts, Mr. North quotes from the reports of the Pastures and Stock Protection Boards of New South Wales, that during 1899 142,000 of these birds were destroyed, the Wagga Wagga district furnishing nearly 25,000 of this number, showing that Riverina is evidently their stronghold, and what a menace they must be to the pastoralist. Many illustrations are contained in the text, that of Queen Victoria's Rifle-bird being a particularly beautiful black and white drawing. Two full-page plates are included in this part, one being the nest of the Australian Raven, and the other depicts sixteen eggs, belonging to nine species of the families Corvus, Corone, Gymnorhina, and Strepera. This is printed in dull chocolate colour, the use of which tint is somewhat questionable. The printing and general get-up of the work have been admirably executed by Mr. F. W. White, of Market-street, Sydney.

"Carpenter on the Microscope."—The eighth edition (price 28s.) of this standard work on the microscope is announced as ready by Messrs. J. and A. Churchill. The work has been much enlarged and revised, and eight of the chapters entirely rewritten, while the volume contains nearly 1,000 illustrations.

Central Australian Anthropology.—Professor Spencer, F.R.S., notified by telegram from Alice Springs on 19th July that his expedition had finished its work at Barrow Creek, where six weeks had been spent among the Kaitish and Ummatjera tribes. Much valuable information relating to tribal organizations, totemic systems, &c., had been collected, and a fine series of photographs of sacred ceremonies, types of natives, &c., secured. The next main camp will be formed at Tennant's Creek, about 150 miles further north (latitude 19° 30′ S.) The members of the party were in excellent health, and well pleased with the results of their work.

THE LESSER GOLDEN PLOVER.—An adult female of the Lesser Golden Plover, *Charadrius dominicus*, Müll., was shot by Mr. Clarence Smart in Hobson's Bay on the 15th of June last. This is either a bird which failed to go north to breed and summer, or returned very early in the season, contrary to the usual practice that young birds come south first, and are followed by parents or adults.—ROBERT HALL.

KING ISLAND.—In the agricultural columns of the *Australasian*, of 27th July, "Bruni" writes that King Island, hitherto regarded as useless, has, owing to the spread of an introduced plant, become valuable for dairy farming. When the members of the Field Naturalists' Club of Victoria held their first extended "camp-out" there, in 1887 (*Victorian Naturalist*, iv., p. 129), the country was reported as being sandy, and sterile, and unsuitable for grazing, but it seems that since that time some seeds of a clover-like plant, *Melilotus officinalis*, were washed ashore from a wreck on the southern coast, and, contrary to the usual custom of introduced plants, has transformed the barren wastes into splendid pasture. The island now supports a population of about 250, and boasts a general store with post-office, while a creamery is talked of, but no school, church, or hotel has yet been established. The official requirements of the island are supplied by a police trooper. In the following issue of the *Australasian*, Mr. Frank Madden, M.L.A., writes warning farmers in Victoria against trying the Melilot as a pasture plant, as it is nothing more than a useless weed. It is, however, according to Baron von Mueller, "Select Extra-Tropical Plants," a valuable honey-yielding plant.

MOTH TAXIDERMY.—The summer number for 1901 of the *Boy's Own Paper* contains a useful article on the stuffing of the bodies of moths, in order to avoid "grease," &c., from the pen of Mr. Linden Heitland, formerly secretary of the Middlesex Zoological Society. The article is too long to quote here, but is worthy of perusal by those who wish to preserve specimens of *Zeurera eucalypti*, &c., with their natural appearance.

NATIONAL TOURING ASSOCIATION.—The objects of this Association, which is primarily intended to facilitate the enjoyment of cycling and touring, if not quite in accord with those of field naturalists, should, at any rate, be helpful to them in their outings, and provide, among other things, for the publication of guide-books to interesting portions of the State. Membership can be obtained for an annual subscription of five shillings, and when the association is thoroughly going is expected to secure conveniences and advantages unobtainable by individual effort. The first number of the *Tourist*, the official organ of the Association, is announced to be published this month. The secretary, Mr. B. Garnet, Equitable Building, Collins-street, will be glad to furnish further particulars to intending members.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th August, 1901. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 45 members and visitors were present.

REPORTS.

A report of the Club excursion to Mitcham, on Saturday, 13th July, was given by Mr. J. A. Kershaw, in the absence of the leader, Mr. G. Coghill. The beautiful weather was no doubt partly responsible for attracting a more than usual number of members and friends to spend an afternoon among the heath. Both the pink and the white Epacris was very plentiful, and members freely availed themselves of the opportunity to gather some of the best specimens, although the visit was found to be a little late for the best blooms. A few of the early orchids were noticed in flower, besides a number of the commoner wild flowers usually met with in this district. The locality would, no doubt, be well worth a visit a month or two later.

The hon. librarian reported the receipt of the following donations to the library :—"Proceedings Royal Society of Victoria," vol. xiv., part 1, from the Society; "Records of the Australian Museum," vol. iv., No. 3, also, "Nests and Eggs of Birds found Breeding in Australia and Tasmania," part 1, by A. J. North, C.M.Z.S., Ornithologist, Australian Museum, Sydney, from the Trustees, Australian Museum; *Queensland Agricultural Journal*, July, 1901, from the Department of Agriculture, Brisbane; *Nature Notes*, June and July, 1901, from Selborne Society, London; *Knowledge*, July, 1901, and *Science Gossip*, July, 1901, from the proprietors; "Annual Report of Smithsonian Institution, 1898," from the Institution; "Proceedings Boston Society of Natural History," parts 9–14, from the Society; "Transactions of the Nova Scotia Institute," vol. x., from the Institute; and "Transactions of the Wisconsin Academy, 1899," from the Academy.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. E. O. Thiele, Workingmen's College, and Mr. J. S. Tarrant, Alexander-street, Balaclava, were duly elected members of the Club.

PAPERS.

1. By Messrs. H. T. Tisdall and C. C. Wallis, entitled "A Botanical Trip to Emerald."

The authors gave a very interesting account of a short visit to this district in May last, and mentioned a large number of botanical specimens noticed during their stay, few of which were, however, in bloom. Among the specimens obtained was a rare fungus, *Craterellus multiplex*, which Mr. Tisdall stated he had not seen for some twenty years. The Native Mulberry, *Hedycarya cunninghami*, was found growing very luxuriantly, the wood of which, it was stated, used to be greatly prized by the aborigines for producing fire by friction.

The President congratulated the authors on their interesting paper, and drew attention to the fact that this locality had been included in the new list of excursions for this year.

2. By Mr. R. Hall, entitled "A New Species of Pseudogerygone."

The author described a Fly-eater from North-West Australia, which he considered differed sufficiently from other members of the genus as to be regarded as a new species, and on account of its general dusky appearance proposed for it the name of *P. tenebrosa*, Dusky Fly-eater.

3. By Mr. R. Hall, entitled "New Nests and Eggs."

The author described the nests of the Yellow-tinted Honeyeater and the Rufous Bush-Lark, together with the eggs of the latter, all received from North-West Australia.

In a short discussion which followed, Mr. G. A. Keartland stated that he could not detect any difference in the eggs of *M. woodwardi* from that of the common species, but that without seeing specimens of the bird an opinion could not be expressed as to the validity of the species, about which there seemed to be considerable doubt in the minds of several ornithologists.

Messrs. Le Souëf, Barnard, and the President also took part in the discussion.

NATURAL HISTORY NOTES.

Mr. H. T. Tisdall read an extract from a local newspaper reporting the poisoning of cattle at Pascoe Vale owing to their eating an introduced plant known as the "Cape Tulip." Mr. Tisdall stated that his attention had been called some two or three years ago to a poisonous plant bearing a small yellow flower growing near Broadmeadows, which he found was *Homeria collina*, one of the family *Irideæ*, and which affected cattle very badly after eating it, and the plant recently reported was the same.

Some discussion ensued, in which Messrs. Barnard, Keartland, and others took part.

Mr. Tisdall called attention to some fungi exhibited by him which had been treated by the glycerine method recommended by Mr. O. A. Sayce for the preservation of Crustacea, and which he found acted very well with some of the specimens. He thought it well worth experimenting with for the preservation of fungi, and strongly recommended other members to give it a trial.

Mr. F. E. Grant mentioned that a large quantity of sand, containing a quantity of shells of various kinds, brought as ballast in a ship from Durban, had been thrown out on the beach near Williamstown, and conchologists would therefore need to be very careful not to confuse these with the Victorian species.

The President mentioned that a similar case had occurred at Portland.

Mr. F. Wisewould said, as showing the effect of protecting kangaroos, that a small mob of about thirteen could now be seen about three miles from Pakenham.

Mr. Le Souëf stated that the kangaroo had been nearly exterminated, but, as the result of protection, they were largely increasing, especially in various parts of Gippsland, where the farmers were complaining of the destruction caused by them to their crops.

The President read some extracts from a letter he had just received from Professor Spencer, dated from Barrow Creek, Central Australia, giving some details of the work he was engaged on, and mentioning some of the specimens met with.

EXHIBITS.

By M. C. L. Barrett.—Ethnological specimens from Derby, North-West Australia.

By M. A. Coles.—A variety of the Rosehill Parrakeet, *Platycercus eximius*, having canary colour on back and breast, and tail and wing feathers partly white; shot at Rupanyup by Mr. T. H. Skene.

By Messrs. J. E. Dixon and C. French, jun.—Destructive longicorn beetles, *Uracanthus bivitta*, collected at Spring Vale. These insects were breeding in the introduced broom, *Cytisus scoparius*, this being a new food plant for these longicorns.

By Mr. C. French, F.L.S.—Coloured plate of Australian longicorn beetles, with pectinated antennae, including four new species; drawn by Mr. C. C. Brittlebank.

By Mr. C. French, jun.—Coloured plate of "Cape Tulip," *Homeria collina*.

By Mr. C. J. Gabriel.—Fern, *Lomaria discolor*, var. *bipennata*, from Dandenong Ranges.

By Mr. G. A. Keartland.—Sand shoes as worn by natives of North-West Australia during hot weather. Made from the bark of *Croatalaria cunninghami*.

By Mr. D. Le Souëf, C.M.Z.S.—Eggs of White Egret, *Herodias timoriensis*; Little Egret, *Garzetta nigripes*; and Plumed Egret, *Mesophonyx plumifera.*

By Mr. W. J. Morgan.—Lava from Mt. Rouse, illustrating flow of volcanic material; rock formation—carbonate of lime cementing quartz, slate, &c., from Hustler's Mine, Bendigo.

By Mr. G. E. Shephard.—Two Wattled Honey-eaters, *Acanthochaera carunculata*, normal colour and albino; shot at Somerville.

By Mr. E. T. Stevens.—Beetles from Elsternwick district, including *Schizorhina bakewelli.*

By Mr. E. O. Thiele.—Part of fossil tree found below the basalt in the quarry at Collingwood. The wood is impregnated with crystals of pyrite and aragonite.

By Mr. H. T. Tisdall.—Specimens of the poisonous Iridaceous plant, *Homeria collina.*

By Messrs. H. T. Tisdall and C. C. Wallis, in illustration of their paper.—30 sheets dried plants, 12 coloured drawings, and 6 bottles of specimens in formalin.

By Mr. C. Walter.—Dried Victorian plants from new localities. *Eucalyptus stellulata*, black sallywood, Snowy River, Murrundale district, E. Gippsland, only recorded from North-East previously. *Acrotriche ventricosa* (*Styphelia ventricosa*, Lueh.), Snowy River, E. Gippsland; this plant was described last year by Mr. J. G. Luehmann as a new species from the Dandenong Ranges; collected by Mr. E. E. Pescott, Orbost; also, *Styphelia serrulata* (*Acrotriche serrulata*, Labill.), exhibited for comparison with above.

After the usual conversazione the meeting terminated.

THE VISIT TO THE NATIONAL MUSEUM.

The June excursion of the Club was devoted to a visit to the National Museum, Public Library buildings, when Mr. J. A. Kershaw, F.E.S., the curator of the Zoological department, and acting director of the Museum during the absence of Prof. Spencer, M.A., F.R.S., kindly pointed out to the members some of the more interesting specimens, and gave some details of the present and future schemes of arrangement. A sketch of the director's intentions was given by him in the *Naturalist* for May, 1900 (vol. xvii., page 14), but some further details of the present appearance of the collection may be interesting to naturalists who have not had the opportunity of seeing it in its new home.

Since the removal from the University buildings nearly all the cases have been rebuilt, and are now constructed with as little wood as possible, and the wooden shelves replaced by plate glass,

so that an almost uninterrupted view may be obtained of their contents, while all the wood-work is now polished black, instead of in its natural cedar or mahogany colour. A large number of the specimens have been re-labelled, and further interest is given by the introduction of cards, on which appears a map of the world, coloured, to indicate the geographical distribution of each genus, while in some instances, such as for cases containing special groups, more extensive notes about the habits of the specimens have been added. In the arrangement of the cases much more room has been allowed to permit of visitors viewing the cases from all sides, and the system of arrangement has been altered from that of geographical grouping to zoological sequence.

Entering the main hall, about 154 x 119 feet, by the present entrance at the western end, the visitor is at once attracted by the fine groups of mammals on either hand, but, in order to systematically follow out the arrangement, one must proceed to the other end of the hall, where, when the new buildings in course of construction are completed, the main entrance will be situated. The mammals occupy the whole central floor space of the hall, and commencing on the left-hand side with the Monotremata and Marsupialia, the student follows round order after order till he reaches the Primates almost opposite.

Contrary to the custom in most museums, here the majority of the larger mammals are shown without cases, being arranged in groups, built up in pyramidal form on artificial rock-work. Thus, in going round the hall, after the marsupials we come to the first group of the Ungulata, group A, which is devoted to the section Suina, of the sub-order Artiodactyla (paired toes), and surmounted by a hippopotamus, comprises twelve examples of ten species. Passing a few small cases, group B, order Ungulata, sub-order Artiodactyla, which is one of the features of the Museum, attracts our attenton. This contains a fine collection of deer, antelopes, &c., numbering 65 specimens and representing 47 species. Close by group C, composed of representatives of the same order and sub-order, numbers 29 specimens, of 18 species, and includes the giraffe, yak, camels, llama, &c. Crossing to the other side of the hall, and passing some cases with fine examples of Arctic fauna in winter dress, we come to group D, devoted to members of the sub-order Perissodactyla (unpaired toes) of the Ungulata, which, with representatives of the Asiatic and African elephants, comprises 29 specimens, such as zebras, rhinoceros, tapirs, &c., belonging to 11 species. Passing some minor exhibits, we come to group E, another extensive collection of animals representing the Carnivora, and comprising 53 specimens, belonging to 36 species. Here we find the seals on the rocks and in the caves, while the bears, leopards, lions, &c., are placed about on rocky ledges. The collection of Quadrumana is contained in several

large cases, and includes one of the first pairs of gorillas sent from Africa, and which is still one of the finest in any museum. The centre of the hall is occupied by several groups of skeletons, arranged in close proximity to the corresponding stuffed specimens; while suspended overhead are the skeletons of members of the Cetacean order.

The bird collection commences near the western entrance, and occupies a series of cases underneath the western and northern galleries, together with a number of cases of special groups. Among these may be mentioned a group of Regent-birds, *Sericulus melinus*, with their bower and natural surroundings. A fine case of Birds of Paradise contains 30 species, represented by nearly 50 birds, arranged in various positions on the branches of a tree, and includes such rarities as *Paradisornis rudolphi*, *Astrapia nigra*, and *Astrarchia stephaniæ*. The collection of parrots close by is a brilliant gathering of some 150 specimens, but the most striking display of the Ornithological department is that made by the recently arranged groups of our unique Australian avi-fauna, the Lyre-birds, Black Swans, and Native Companions, each in cases about 15 feet long by 10 wide and 10 high. Here we have the whole life-history of each bird from nest and eggs to the adult. Thus the Lyre-bird case contains eight or ten adult birds, with some half-dozen young of various ages, together with the nest, situated in the forked trunk of a tree, which was removed bodily, not without a great deal of trouble, from a secluded gully of the Dandenong Ranges, while another portion of the case is occupied by a "playing ground," with several birds engaged in their favourite pastime. In the neighbouring case the Black Swans are represented with their eggs in the nest, built of water weeds, rubbish, &c., among the bulrushes on the edge of an artificial piece of water, on which both adult and young birds are apparently swimming about, while more birds are on the wing overhead; altogether some seven or eight adults and as many young are here exhibited. The Native Companion, *Antigone (Grus) australiana*, case contains, in addition to a young chick, seven adult birds, each in a characteristic attitude assumed by these creatures when engaged in one of their amusing dances. Though the positions of the birds are somewhat grotesque, the case has been much admired as a truthful representation by many country residents who have witnessed this curious performance.

The southern side of the hall is devoted to the fish and reptile collections, each in its systematic order. The galleries are occupied by the mineralogical and geological collections. The latter, however, is not yet available to the public. The shells, insects, and invertebrate collections will not be opened to the public until the completion of the new building.

There will doubtless be some slight changes in the arrange-

ment when the new rooms are finished, principally in that most of the Australasian specimens will be removed to a special department, as mentioned by Professor Spencer in the article referred to. The additional space gained by this transfer will then be occupied by numerous specimens from other parts of the world at present in the reserve collection, and which for the want of room cannot be placed on view. This may not take place for some time; however, in the meantime the public have in its present shape a collection of Natural History objects which is both artistically and scientifically arranged, and of the greatest interest to the student as well as to the mere sightseer. In the foregoing sketch no attempt has been made to enumerate the rarities in the collections; about these we hope to have a series of articles when opportunity offers.

SOME NORTH-WEST QUEENSLAND BIRDS.

(Concluded from page 59.)

By Wm. Macgillivray, M.B., B.S.

(*Read before the Field Naturalists' Club of Victoria, 11th March*, 1901.)

My brother describes rather an ingenious method employed by the blacks for catching numbers of Flock Pigeons, advantage being taken of the fact that the pigeons have favourite watering places along the edge of a waterhole. Alongside one of these spots a hole is dug deep enough and large enough to conceal a Black when covered over with boughs, which are stuck into the mud round the margin of the hole. This black has a spear-like stick, 12 or 15 feet long, to the distal end of which is attached by the whole of one edge a net four feet square, the opposite side being pegged to the ground. The net and stick are kept on the ground, and when the flock alights the net is whipped over them by the blackfellow, who is watching from his hiding-place in the hole; he instantly jumps out and kills all the birds by biting their necks, throws them into his hole, and gets back himself with net set in time for the next mob. In this way my brother has seen a black take as many as two hundred pigeons in a little over an hour.

Phaps chalcoptera and Geophaps, sp.—The Bronze-wing Pigeon occurs throughout the district, but nowhere in numbers, whereas the Squatter or Partridge Pigeon can only be considered an occasional visitor.

Lopophaps plumifera.—My brother states that the Plumed Pigeon lays in October, the two cream-coloured eggs being placed on the bare ground under a spinifex tussock, on the seeds of which the birds feed. They are exceedingly tame, and are very easily caught, especially when sitting on eggs.

Ocyphaps lophotes.—The graceful Crested Pigeon is found

in numbers along all the creeks in the Gulf country. It usually feeds on the ground on various kinds of seeds, flying into the nearest tree when alarmed.

FALCO LUNULATUS.—The Little Falcon is present, but cannot be said to be numerous.

FALCO SUBNIGER.—The Black Falcon has earned for itself the local soubriquet of the "black pirate," preying on birds which frequent the plains, such as Flock Pigeons, Quails, and Larks. It will also eat grasshoppers when they are numerous.

HIERACIDEA, sp.—A Brown Hawk frequents the small clumps of timber to be met with occasionally out on the downs.

ACCIPITER CIRRHOCEPHALUS.—The Sparrow-hawk will kill domestic poultry in the same way that it does wild duck, but is only an occasional visitor to the fowl-yard.

CERCHNEIS CENCHROIDES.—My brother mentions being camped near a Kestrel's nest, and saw a number of snakes brought to it for the young. The snakes were mostly small ones, a foot or so in length. The Kestrel occasionally nests on *débris* left by a flood in the fork of a tree.

UROAETUS AUDAX.—Wedge-tailed Eagles are common on the downs. As trees sufficiently large to hold one of their nests are not common on the downs, recourse is often had to a low bush.

HALIASTUR SPHENURUS.—The Whistling Eagle is a common bird, and, as in other parts of the continent, extremely local in its habits, building near the same spot year after year.

MILVUS AFFINIS.—The Kite is exceedingly numerous, and will eat anything from grasshoppers to carrion. They are very bold. I have frequently seen them pick up a chicken from under a verandah, coming in at one end and out at the other, and eat it on the wing. This they do with most of their food. They nest in the trees along the creeks, and will resort to the same place year after year, relining the old nest until its foundations begin to decay, when a new one is constructed.

ELANUS AXILLARIS and E. SCRIPTUS.—The latter is the commoner of these two elegant little kites, and nests out on the downs in small clumps of trees, four eggs being the usual clutch.

CIRCUS GOULDI.—This Harrier seeks its living on the downs, skimming over the grass, only resorting to a tree to construct its nest.

STRIX DELICATULA.—When the little plain rat is numerous, occurring as it sometimes does in plagues—an unaccountable increase in fecundity of these creatures which spreads like a wave over a certain tract of country, only to die out as rapidly as it commences—the owls and other birds of prey congregate to the harvest. I well remember on one of these occasions, on moonlight nights when hardly anything could be heard but the squealing

and fighting of innumerable rats, seeing the whole roof ridge, tops of posts, and, indeed, every point of vantage occupied by Delicate Owls.

STRIX CANDIDA.—The Grass Owl is occasionally met with on the downs, in the long grass, where they nest.

NINOX, sp.—A Boobook Owl is sometimes seen, but has not been identified.

MICROTRIBONYX VENTRALIS.—This is the commonest of the Water-hens. Flocks may often be disturbed when feeding along the edge of a waterhole or amongst the polygonum on the dry bed of a billabong. The Blacks' name for this bird is "Partha."

EUPODOTIS AUSTRALIS.—During the breeding season the male Bustards are in the habit of displaying themselves to the greatest advantage before the hens, drooping the feathers of the neck, which is puffed out, and with wings and tail spread out, they strut about, much after the fashion of a peacock. Nesting takes place during or shortly after the summer rains.

My brother mentions, as illustrating the early development of the instinct of protection, once finding a nest which contained a chipped egg and a young bird which had just emerged from the shell; the latter, on hearing his approach, crawled out of the nest into the grass and hid itself.

STILTIA ISABELLA and GLAREOLA ORIENTALIS.—Of the Pratincoles the former is tolerably common, and earns its living on the wing, like a swallow, and may often be seen flying up and down the plain, close to the ground, uttering its peculiar whistling cry the while. I well remember finding a pair of eggs on a dry, gravelly ridge, far from any water. No attempt is made at a nest, and the bird practises the same tricks to lure one from the vicinity of the eggs common to the order. My nest was taken in November; others have been taken by my brother in January. The Oriental Pratincole arrives during the wet season, and only stays about a month, but is usually in goodly numbers.

ÆGRILITIS MELANOPS and ERYTHROGONYS CINCTUS are the commonest of the dottrels.

LOBIVANELLUS MILES.—The Masked Plover, a more slender bird than our Spur-wing, resembles it very closely in all its habits. They are numerous, it being no uncommon sight to see 40 or 50 in a flock. They breed in January and February. My brother mentions finding one clutch of five eggs.

HIMANTOPUS LEUCOCEPHALA.—Stilts are always present during the wet season, and the Avocet an occasional visitant.

ROSTRATULA AUSTRALIS.—The Painted Snipe is sometimes disturbed when seeking a living on the muddy margin of a waterhole or billabong.

The three species of Ibis have been noted, the Glossy being rare.

PLATALEA REGIA.—This is the commoner Spoonbill, being found on most waterholes. It nests during the summer rains.

XENORHYNCHUS ASIATICA. — The Black-necked Stork, or Jabiru, is only occasionally seen inland, but is more common on the lagoons near the Gulf. My brother found a nest and two eggs towards the end of April, 1877, on Spear Creek, near Iffley station. The nest was a large one, composed of sticks and twigs, in a tall eucalypt. The eggs he left at Iffley till his return from Cooktown. Unfortunately they were destroyed.

ARDEA NOVÆ-HOLLANDIÆ and A. PACIFICA.—Both these Herons are quite common, as is also the Nankeen Heron and two Egrets.

DENDROCYCNA EYTONI and D. VAGANS.—Eyton's Duck is very common, occurring in large flocks. I have myself seen a blackfellow kill 25 by discharging both barrels of his gun into a mob as they sat with outstretched necks uttering their loud, whistling note. These birds nest three or four miles out on the downs, in the grass, a usual clutch being 10 or 11. The nest contains no down, being made of grass. The other species is only rarely seen.

Teal, the Black, the Pink-eared, and the White-eyed are the other ducks of the district.

The Emu, *Dromæus novæ-hollandiæ*, is becoming more plentiful now that the dingoes are being kept down by sheep-breeders.

DESCRIPTION OF A NEW SPECIES OF PSEUDOGERYGONE.

By ROBERT HALL.

(*Read before the Field Naturalists' Club of Victoria*, 12*th August*, 1901.)

I RECENTLY received two skins of a Pseudogerygone from Mr. J. P. Rogers, obtained at the Fitzroy River, North-West Australia, which differ sufficiently from other members of the genus to warrant me in assigning them to a new species.

The skins are those of male and female birds, the former fully adult, the latter not quite adult, and were obtained in June, 1900, and March, 1901, respectively. There is however little difference in the plumage of the sexes. The most noticeable features are that there are no white or tawny tips and no subterminal band to the tail; the outer edges of all but the first and second primaries are edged with dull white, while in the male the bill is thoroughly black. The female shows new central tail quills, two-thirds of the normal length, of the same uniform ashy-brown as the others, and bearing no subterminal or whitish spot, showing the constancy of the two ages of tail.

On account of the sombre tail, the general unassuming appearance, and by having the least conspicuous marking of any specimens of its genus, I propose for it the name of *Pseudogerygone tenebrosa*, the Dusky Fly-eater, and append detailed descriptions of the male and female.

PSEUDOGERYGONE TENEBROSA, sp. nov., Dusky Fly-eater.

Male.—General colour above, pale rufous-brown, rather ashy-brown on the head and pale rufous on the rump and upper tail coverts ; tail uniform ashy-brown, with twelve almost obsolete bars of a darker shade across each of the central feathers ; wing chocolate-brown, excepting the two outer primaries, which are edged with white ; secondaries bordered with tawny-white ; under wing coverts white, and inner webs of secondaries ; lores, eyebrows, and narrow ring round each eye, white ; ear coverts pale reddish-brown ; throat and under surface white, washed with pale yellowish-brown ; flanks yellowish-brown ; under tail coverts white ; bill, legs, and feet black ; irides white. Dimensions.—Length (skin), 4.75 inches ; wing, 2.2 inches ; tarsus, 0.7 inch ; culmen, 0.4 inch.

Female.—Nearly full adult. In general agreement with the male ; bill brownish-black, with a pale creamy line along keel of lower mandible ; edges to primaries creamy-white ; legs and feet black. Dimensions.—Length, 4.4 inches ; wing, 2.05 inches ; tarsus, 0.7 inch ; culmen, 0.4 inch.

Habitat.—Fitzroy River, North-West Australia.

The key to the species may be laid down as follows :—" Tail uniform ashy-brown ; lores and eyebrows creamy white ; throat whitish, like rest of under surface, and all lightly washed with pale yellowish-brown, the flanks being a shade darker ; bill entirely black."

NEW NESTS AND EGGS.

By Robert Hall.

(*Read before the Field Naturalists' Club of Victoria, 12th August*, 1901.)

AMONG other specimens collected on the Fitzroy River, North-West Australia, by my friend Mr. J. P. Rogers, were the nests of the Yellow-tinted Honey-eater, *Ptilotis flavescens*, Gould, and the Rufous Bush-Lark, *Mirafra woodwardi*, Milligan, as well as the eggs of the latter bird.

Skins of the birds were forwarded with the nests in order that the identification might be certain, and as no descriptions of the nests have yet been published, I take this opportunity of recording them.

PTILOTIS FLAVESCENS, Gould, Yellow-tinted Honey-eater.

Description of Nest.—Considering the size of the bird, the nest is small. The form is cup-shaped, made of fine grass and narrow strips of bark, with small portions of wire and spider's nest material placed externally. Within the bowl is a slight and rough lining of bark. Dimensions.—Breadth of whole structure, 2.25 inches; depth, 1.5 inches; inner diameter, 1.6 inches; depth of cavity, 1.35 inches. The position of the nest was some eight feet from the ground, and suspended from the branch of a eucalypt.

MIRAFRA WOODWARDI, Milligan, Rufous Bush-Lark.

This bird is comparatively new to science, having been described by Mr. Milligan before this Club in May last (*Vict. Nat.* xviii., p. 25.)

Description of Nest.—A rounded structure of grass, placed in a slight excavation in the ground under a tussock of Mitchell grass, and having a small bank raised round it. Mr. Roger's diagram shows a hood above the level of the ground-line, which partly screened the eggs from view. The material was broad blades of grass, with a lining of finer grass. Dimensions.—External, 6.5 inches by 4.5 inches, with a depth of 3.5 inches; internal, 3.25 by 3 inches; depth, 2.25 inches.

Description of Eggs.—General appearance greyish-brown spots and short streaks numerously placed upon the whole surface of a greyish-white ground colour, while fainter than the greyish-brown spots, and appearing as if below them are faint lilac-grey spots. The texture of the shell is glossy. Set *a.*—Three in number, collected 10th February, 1901. Axis, 0.75 inch; diameter, 0.55 inch. The three eggs vary in the disposition of the spots and streaks, and one has a zone of the same coloured spots round the broader end; the second has its spots more finely shown, and greyer than those of the third, which are browner and heavier. Set *b.*—Two in number, collected 11th February, 1901. Axis, 0.8 inch; diameter, 0.55 inch, similar to those of set *a*, but having a brown ground colour.

Locality.—Myroondah homestead, Firtzroy River, North-West Australia.

A TRIP TO THE MALLEE AND THE GRAMPIANS.

By D. BEST.

(*Read before the Field Naturalists' Club of Victoria, 11th March,* 1901.)

HAVING secured two other well-known collectors—Messrs. C. Walter and C. French, jun.—as companions for a holiday trip, we decided to take advantage of the opportunity offered by a farmers'

cheap railway excursion to Rainbow. Cheap it certainly must be admitted to be, 22s. 2d. being the fare for a trip of 534 miles, with the right of breaking our return journey as often as we pleased—a privilege we very liberally availed ourselves of.

Rainbow is 42 miles north of Dimboola, and, as will be seen by reference to the map, is right in the heart of the Mallee. The traffic at the time of our visit was not extensive, three trains per week sufficing for all requirements, but later on, when the harvest had been reaped, there would naturally be a considerable increase. So far as excursionists were concerned, we were the only three who took tickets for the whole distance, none of the others going beyond Dimboola. It may perhaps be as well here to state that our object was principally the collecting of plants and beetles, and although we, of course, did not neglect other branches of natural history, these were the two that received most of our attention.

The morning of our departure—Wednesday, 24th October—was a most disagreeable one, a strong north wind blowing, accompanied by clouds of dust, and we were therefore not at all sorry to leave all this unpleasantness behind us. After a tedious journey of thirteen hours, including an unlooked-for detention of an hour at the small township of Lubeck, we reached Dimboola a little after 9 o'clock at night, and, as the weather had turned very cold, we were glad to have some tea and turn in.

Leaving Dimboola on the following (Thursday) morning at 8.30 we reached Rainbow at about 11, and, entrusting our belongings to one of the two local storekeepers, by name Zimmerman, we started for Lake Albacutya, some eight miles distant northerly. Knowing the reputation of the Mallee for scarcity of water, we took the precaution to provide ourselves with some liquid refreshment—a wise step on our part, for not a drop was procurable until our return. The country all the way to the lake is most miserable looking, everything, even at this early period of summer, presenting a dried-up appearance, but there were occasional fields of wheat, which, owing to the exceptionally fine season, were all looking well, and their beautiful green colour was in marked contrast to their surroundings, as well as a great relief to the eyes. Along the track the timber is mostly She-oak, *Casuarina glauca*, Murray Pines, *Callitris verrucosa*, and two species of Mallee, *Eucalyptus gracilis* and *E. uncinata*, many of the two first named being dead. On the eucalypts there was very little insect life, but under the loose bark of the She-oaks we secured a few small carab beetles, also two species of Adelium. Our greatest good fortune, however, was the securing a number of the large carab, *Gigadema intermedia*, a beetle about one and a half inches long by half an inch broad across the elytra. It seems rather strange that a carab, of all beetles, should seek such

dry shelter, for, as a general rule, this family prefers moist spots. Logs, of which we turned over a goodly number, yielded very little, the ground being much too dry, and all we secured from this source were a few specimens of Promecoderus, very similar to the *P. brunnicornis*, common around Melbourne, and two species of Notonomus. Of butterflies we saw but one species, *Pyrameis kershawi*, and of Hymenoptera practically none.

Arriving at Lake Albacutya we partook of our frugal lunch and resumed collecting, but ill success still attended our labours, there being really no insects under the bark of the large trees surrounding the lake, nor on the leaves, which received a vigorous shaking into our umbrellas. That portion of our statement, however, as regards under the bark requires a little qualification, for we must make an exception in favour of spiders, of which there were thousands, principally Tarantulas. Some of these were the largest we had ever seen, and we secured two or three, hoping they would live until our return home, so that they might be exhibited at one of our meetings and afterwards presented to our fellow-member, Mr. Frost, but, unfortunately, they did not long survive their confinement in a tin box. Plants were fairly abundant, amongst those noted being *Lavatera plebeja*, one of the marsh mallows, with pretty light-blue flowers; *Pittosporum phillyroides*, having cream-coloured drooping flowers—this latter was very plentiful around the lake. We also collected some of the beautiful grass *Eragrostis falcata*. About half-way to the lake there was quite a small forest of one of the tobacco trees, *Nicotiana glauca*, with its yellow flowers, and which, so we were told, had been originally introduced and planted there in the expectation that the leaves would prove useful for sheep-washing purposes, but we believe it turned out a failure; at all events we could not learn of its ever being now used. The lake itself, though of large size, being several miles in length and breadth, is far from cheerful-looking, the water being something of a dirty-white colour and brackish in taste, and consequently undrinkable. Moreover, it is shallow, and, so we were informed, likely to be dried up before the end of the summer; but we think this is rather improbable, owing to the fair quantity of rain that has fallen since our visit. What, however, made the lake seem to us so very cheerless and desolate was the entire absence of water birds; not one did we see, not even a common cormorant. Later on, whilst in Stawell, we were told by a former resident of Dimboola that a few years back he used frequently to drive to the lake for wild ducks, of which there were then plenty, but, judging from our experience, we fancy he would find it difficult to get any now. Of snakes we did not drop across a single specimen during our stay in the mallee, but of the Blue-tongued Lizard, *Trachydosaurus rugosus*, we saw a large number—at least thirty to forty—and doubtless could have seen

more had we taken the trouble to search for them. We omitted to mention that on our way to the lake we met a typical Mallee sundowner. His skin was something more than a dark brown colour; he was clad in the scantiest of garments, carried no swag, but instead thereof was wisely provided with a water bag, which he carried with jealous care.

Returning to Rainbow, we were greatly disappointed to find that the farmer to whom we had been recommended was unable to accommodate us, and, there being no hotels, we should have been under the necessity of camping out had it not been for the kindness of the before-mentioned store-keeper, Zimmerman, who, at great personal inconvenience, provided us with beds and meals, for which he could not be induced to accept any remuneration. Our intention was to have stopped at Rainbow until the Saturday, but, as we felt it would be trespassing too much on his hospitality, we decided to start on the Friday morning for Jeparit, 22 miles distant. Close to the Rainbow station are a number of *Heterodendron oleæfolium*, or Olive-leaved Heterodendron (Sapindaceæ). These, so Mr. Walter says, are the finest trees of the kind in Victoria, being in marked contrast to the comparatively stunted ones he has seen near Swan Hill. On some of these trees were still a few seeds, which are of a bright scarlet colour. Of course, we searched carefully for beetles, but only secured a few specimens of a small curculio. The land on which these trees are growing has been permanently reserved as a cemetery, and we trust the trees also will be carefully protected, as they are the only ones in the district.

After a cordial farewell to our kind host, we started about 8.30 on our tramp to Jeparit, and it proved a rather trying one, as the day was the hottest we experienced during our whole trip. The track was fringed with plenty of small eucalypts, and from these we took a few Curculios of the genus Belus, but what they principally yielded was a number of beautifully coloured Chrysomelas of the genus Paropsis, some especially being of a bright green and scarlet colour; but the colours are very perishable, and long before our return home they had so completely faded as to be quite unrecognizable as the lovely ones we had previously so much admired. No trees of any size were met with, nor any logs, so that we had no opportunity of testing these sources for specimens. After travelling several miles we came to a stretch of sand hills about four miles in length, and walking on these was very tiring, but we were well repaid by seeing the large-leaved Mallee, *E. incrassata*, in flower—and a really pretty sight it is—and also by observing a specimen of the large dark-brown buprestis beetle, *Stigmodera parvicollis*, which we, unfortunately, did not have the good fortune to secure. We feel certain we were rather too early for this beetle, and fully believe that in a week or two later they

would be fairly plentiful. Insects still continued scarce, the Mallee yielding nothing, nor the other shrubs, with the exception of an occasional one of *Leptospermum scoparium*, from which we took two species of Stigmodera and a few bright golden Cleridæ. These sand hills appear to be the home of flowering shrubs, and, although the country is a most unpleasant one to travel in, one is well repaid by a spring or early summer visit to them. What we more particularly noticed were two species of Halgania, viz., *H. cyanea* and *H. lavandulacea*, with their bright lavender-blue flowers; *Prosthanthera coccinea*, having flowers of a bright red; *Boronia cœrulescens*, *Daviesia genistifolia* (of this we saw only one plant, but it was covered with its beautiful yellow flowers); *Brachycome ciliaris*, with flowers of various colours, some being blue, purple, and white; also *Helichrysum blandowskianum*, or Woolly Everlastings, with their large white flowers.

As it was getting rather late by the time we had crossed the sand hills, we hurried on, and reached Jeparit, fairly done up, about seven o'clock, and soon retired for a good night's rest. On the Saturday morning, as we had a few hours to spare before the train left for Dimboola, we went to the Wimmera River, some half-mile distant, and which was quite a respectable stream, but there were no shrubs there, so we tried under the bark of the large eucalypts, *E. rostrata*, and took two species of Longicorns, viz., *Phoracantha recurva* and *Tryphocharia hamata*; also some Adeliums and a few Elaters of the genus Lacon. Of plants we got *Anthocercis myosotidea*, which is entirely restricted to the North-West, with a flower like the common Forget-me-not, and growing in large cushions close to the ground; also *Cressa cretica*, one of the Convolvuli, having greyish leaves, but it was not in flower.

(To be continued.)

Table Cape Fossils.—We are glad to be able to announce that the collection of fossils from the Older Tertiary Beds at Table Cape, North-West Tasmania, which was made by our fellow-member, Mr. E. D. Atkinson, during his many years residence in that locality, has been purchased by the National Museum of Victoria. The collection is of considerable value, as it formed the basis of a critical revision of the fauna of the deposit by Mr. G. B. Pritchard in a paper published in 1896 by the Royal Society of Victoria. The fossils are mainly mollusca. One hundred and forty-four species in all are represented, and of these fifteen are types of new species of mollusca. It is satisfactory to know that the collection is now in safe custody, and the types are where they should be, in a public collection, and not in private hands.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 9th September, 1901. Mr. O. A. Sayce (one of the vice-presidents) occupied the chair, and about 80 members and visitors were present.

REPORTS.

A report of the visit to the Botanical Gardens on Saturday, 17th August, was given by Mr. F. G. A. Barnard, who said that, in the unavoidable absence of Mr. F. Pitcher, Mr. C. French, jun., had kindly acted as conductor. Attention was principally devoted to the Australian plants, of which a fair number were in bloom, but the majority of the Acacias, of which the gardens contain a large variety, owing to the coldness of the season, were still in bud. Among the plants and shrubs noticed in bloom were *Acacia cultriformis*, N.S.W.; *A. baileyana*, N S.W.; *Bauera rubioides*, Vict.; *B. sessiliflora*, Vict.; *Correa alba*, Vict.; *C. speciosa* (red variety), Vict.; *Chorizema ilicifolium*, W.A.; *Eriostemon myoporoides*, Vict.; *Epacris longiflora*, N.S.W.; *Grevillea alpina*, Vict.; *G. oleoides*, Vict.; *Hakea verrucosa*, W.A.; *Kennedya nigricans*, W.A.; *Styphelia virgata*, Vict.; and *Thryptomene ericœa*, Vict.

A report of the excursion to Sandringham on Saturday, 31st August, was given by the leader, Mr. C. French, jun., who stated that about thirty species of plants were noticed in bloom, among which were *Acacia acinacea*, *A. oxycedrus*, *A. suaveolens*, *A. longifolia*, *Alyxia buxifolia*, *Bossiœa cinerea*, *Correa speciosa*, *Clematis microphylla*, and the orchids *Pterostylis vittata*, *P. nana*, *P. curta*, *Acianthus exsertus*, and *Corysanthes pruinosa*. Several plants of the interesting Lycopod, *Phylloglossum drummondi*, were collected. Attention was also devoted to entomology. Specimens of that remarkable scale insect, *Frenchia casuarina*, which is destroying the She-oaks (Casuarinas) along the coast, were obtained, and the larvæ of several longicorn beetles taken for rearing at home. Mr. J. Stickland reported that the pond life section of the party had an interesting afternoon, a fair variety of Entomostraca being met with. Among them was one belonging to the Copepoda, which appears to be

an unrecorded species of the genus Boekella, but it has not yet been thoroughly examined.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. S. Middleton Ware, 36 Riversdale-road, Hawthorn, was duly elected a member of the Club.

GENERAL BUSINESS.

The chairman drew the attention of members to the exhibition of wild flowers to be held at the next meeting; also to the proposed special excursion to the Grampians on 9th October for the purpose of seeing the Grampian flora at its best.

Mr. D. Best and Mr. Geo. Coghill gave some particulars regarding the district and the best means of getting there, the latter speaking very favourably of the locality for obtaining a good series of botanical specimens in bloom.

PAPERS.

1. By Mr. D. Le Souëf, C.M.Z.S., entitled "The Ocean Beach, Sorrento." The author gave an account of a number of observations he had made on the ocean beach at Sorrento, his remarks being accompanied by a series of lantern illustrations, among which was one showing, *in situ*, the recently discovered fossil remains of an extinct kangaroo, determined by Professor J. W. Gregory, F.R.S., as belonging to the genus Palorchestes.

As an illustration of the botany of the district a picture of a flowering stem of a Grass-tree, *Xanthorrhœa australis*, measuring 5 feet 10 inches in height, was shown; and in the discussion which followed Mr. J. G. Luehmann stated he was informed that the Grass-trees growing near Frankston never flowered unless fire had gone through the country, and in support of this mentioned that he had never seen these plants in flower in the Botanical Gardens.

Mr. G. Coghill expressed his doubts regarding the author's contention that the large quantities of broken shells found in certain spots was evidently the work of the natives in bygone days using the shell-fish for food, stating that if this were so the natives must have been very busy.

2. By Mr. D. Le Souëf, C.M.Z.S., entitled "The Effect of Snow on Eucalyptus Trees." The object of this paper was to show the effect a heavy fall of snow had on the large eucalyptus trees, some being almost denuded of their upper branches through being broken off by the weight of snow. This paper was also illustrated by lantern slides.

NATURAL HISTORY NOTES.

Mr. D. Le Souëf, C.M.Z.S., showed a photograph of a large Carpet Snake after having recently partaken of a heavy meal, the body being greatly distended.

Mr. D. Le Souëf moved that a vote of thanks be accorded Mr. J. Searle for again allowing the Club the use of his lantern, which was carried by acclamation.

EXHIBITS.

By Mr. E. Anderson.—Specimens of moth, *Chlenias pachymela*, Victoria.

By Mr. F. G. A. Barnard.—Pot of Orchids, *Pterostylis nutans*, grown at Kew.

By Mr. A. Campbell, jun.—Five species of Kingfishers of the genus Halcyon, inhabiting Australia :—*H. sanctus* (eastern and western races), *H. macleayi*, *H. pyrrhopygius*, and *H. sordidus.*

By Mr. A. Coles.—Collection of European birds' eggs, including Black Grouse, *Tetrao tetrix* ; Red Grouse, *T. scoticus* ; Ptarmigan, *T. lagopus* ; Pheasant, *Phasianus scoticus* ; Partridge, *Perdix cinerea* ; Red-legged Partridge, *P. rubra* ; Green Plover, *Œdicnemus crepitans* ; Lapwing, *Vanellus cristatus* ; Ruff, *Machestes pugnax* ; and Redshank, *Totanus calidris.*

By Mr. F. P. Dodd, Townsville, Queensland.—Green Tree Ant, *Æcophylla smaragdina*, Fabr., with leaf nests ; scale insects (several species), Aphides (2 species), and the following moths and butterflies found in larval and pupal stages feeding or sheltering in the nests :—*Thalpochares coccophaga*, Meyr. (scale feeder) ; *Arhopala eupolis*, Misk. ; *A. amytis*, Hew. ; *Hypolycæna phorbas*, *Euchloris hypoleuca*, Lower.

By Mr. C. French, jun.—Scale insects (Coccidæ) collected on Club's recent excursion to Sandringham. West Australian and Queensland Fruit Flies, *Halterophora capitata* and *Tephritis tryoni.* The larvæ of Fruit Flies cause an enormous amount of damage to oranges, peaches, pears, bananas, &c., growing in New South Wales and Queensland.

By Mr. G. Lyell.—Living pupæ and imagines of *Ornithoptera cassandra*, Scott, *Papilio capaneus*, Westw., and *P. sarpedon*, Linn.

By Mr. D. Le Souëf, C.M.Z.S.—Shells, *Purpura succincta* and *Mytilus latus*, covered with Annelid Worms ; also root concretions, from Sorrento, in illustration of his paper. Curiously marked Emu egg. Egg of Goose, of unusual colour.

By Mr. C. M. Maplestone.—Specimens of rare orchid, *Caladenia cœrulea*, from Eltham.

By Mr. H. T. Tisdall.—Scale insects, *Frenchia casuarina*, on Casuarina, from Sandringham ; orchids, also *Phylloglossum drummondi*, preserved in formalin, collected on Club's recent excursion.

After the usual conversazione the meeting terminated.

THE LATE PROFESSOR RALPH TATE, F.G.S., F.L.S., &c.

It is with deep regret we record the death of one of the honorary members of the Field Naturalists' Club of Victoria, Professor Ralph Tate, F.G.S., of Adelaide, who died on 20th September, at the age of 61. The late professor showed his inclination for natural science at an early age, having commenced the study of geology when only 12 years old. Six years later he was rewarded for his industry by an exhibition of £80 per annum at the Royal School of Mines, London. After completing his two years' course he engaged in teaching and lecturing, principally on geological subjects, in London and other parts of England. In 1867 he visited Central America and Venezuela as a mineralogical expert. Returning to England, he became director of some mining schools in Durham. In 1875 he was appointed Elder Professor of Natural Science at the Adelaide University, a position which he occupied up to the time of his death. In this position Professor Tate's name became widely known throughout Australia as a hard-working naturalist, and it was only fitting that on the foundation of the Australasian Association for the Advancement of Science, in 1888, he should be chosen as the first president of the Biological Section, and as such he delivered to the opening session in Sydney an able address on "The Influence of Physiographic Changes in the Distribution of Life in Australia," in which he dealt principally with the botanical features in relation to the physical features of the continent. He also contributed at that meeting six papers to Sections C (Geology) and D (Biology). When the Association met in Adelaide in 1893 he was its president, and his inaugural address, entitled "A Century of Geological Progress," was a splendid *résumé* of the Geological History of Australia to that time, thus showing the versatility of the man. In 1877 he announced in a public lecture the existence of a well-preserved glacier path along the edge of the sea cliffs at Hallett's Cove, a few miles south of Adelaide. He was an honorary or corresponding member of most of the scientific societies of Australia, besides many in other parts of the world. His *forte* was conchology and palæontology, but in this brief notice it is impossible to enumerate his contributions to scientific literature, which were very extensive and embraced a vast range of subjects. Several articles from his pen on palæontological matters appeared in the *Southern Science Record*. The only paper he contributed to the Field Naturalists' Club was a conchological one, entitled "On *Voluta undulata* and Allied Species," which was published in the *Vict. Nat.*, vol. v., p. 158, and cleared up the synonomy of the Volutes of the southern coast. He was always fond of doing his own collecting, and thus

visited many parts of Australia for the purpose of making observations on the spot. In 1882, at the request of the South Australian Government, he reported on the mineralogy and botany of the Northern Territory, and in 1894 was a member of the Horn Expedition to the Macdonnell Ranges, Central Australia, on which occasion he took charge of the palæontology and botany. As one of the founders of the Field Naturalists' Section of the Royal Society of South Australia he did much to popularize the natural history of that colony, and nothing pleased him better than to lead one of its outings among the hills and valleys of the Mt. Lofty Ranges. As an author he first came under notice by the well-known appendix, "Recently Discovered Shells, Living and Fossil," which was added to the later editions of Woodward's "Manual of the Mollusca;" while an admirable "Handbook of the Flora of Extra-Tropical South Australia" bears testimony to his botanical knowledge. As showing his varied tastes, for many years he took great interest in a farm in the Nairne district, and more recently became an orchardist near Salisbury, where he had a fine orangery, managed by one of his sons. Finally, we may with safety assert that his place as an all-round naturalist, thoroughly conversant with the flora and fauna, living or extinct, of his adopted land, will probably long remain unfilled.

ALTERATION OF SPECIFIC NAME OF *ÆGOTHELES RUFESCENS*, HALL.

By Robert Hall.

At the June meeting of the Field Naturalists' Club I described, under the name of *Ægotheles rufescens*, a new Owlet Nightjar from North-West Australia (*Vict. Nat.*, vol. xviii., p. 60). Mr. A. J. North, C.M.Z.S., Ornithologist, Australian Museum, has informed me that some time before Count Salvadori used, in the *Ann. Mus. Civ. Genova*, 2nd series, vol. xvi., p. 71 (1896), the same specific name for a Nightjar from the Owen Stanley Ranges, New Guinea. It is therefore necessary to bestow another specific name upon the N.W. Australian bird, and I desire the name *Ægotheles rufa* to take the place of *Æ. rufescens*.

A TRIP TO THE MALLEE AND THE GRAMPIANS.

(*Concluded from page* 84.)

By D. Best.

(*Read before the Field Naturalists' Club of Victoria*, 11*th March*, 1901.)

On arrival at Dimboola we spent the afternoon in looking round the township and in visiting Mr. St. E. D'Alton, who promised to show us likely spots for collecting. Accordingly we made an early start, and down by the Wimmera River, in sandy ground,

we noticed several large logs, and although immediately under them there was no life except a few Centipedes, we were more fortunate in digging into the decayed portions, for we there secured two species of Lucanid beetles, viz., *Figulus regularis* and *F. liliputanus*. We next tried the eucalypt saplings, but these gave no results, so we turned our attention to the loose bark of the big trees, and here we were more successful, securing *Tryphocharia hamata*, also a few small Elaters and Cleridæ. At one tree—and I have often before noticed how one tree amongst many will possess an abundance of insect life—every piece of loose bark covered several of the universally common Longicorn, *Phoracantha recurva*, of which we could easily have secured over a hundred. Up to now we had not seen a specimen of the rather large Paropsis with black and brown stripes, but upon crossing into another paddock every tree was swarming with them ; you could not remove a piece of bark without disturbing scores, and we do not in the least exaggerate when we say they were literally there by thousands. Close to here some clearing was going on, and numbers of large trees had been felled, and from the dry leaves of these we relied upon getting some good things, but were doomed to disappointment, as the shakings into our umbrellas were nothing but ants and spiders, and not many of these. On the river bank was growing a fine plant belonging to the Sandal-woods, viz., *Choretrum spicatum*. This plant is only found in the North-West and North-East, and as this was the solitary specimen to be found anywhere near Dimboola, Mr. D'Alton, who, we may remark, is the Shire Secretary and Engineer, also a well-recognized botanist, is very anxious to have it preserved.

On the following day (Monday) we tried the sand hills on the other side of the township, away from the river, on the Warracknabeal road, and on the *Baeckea behrii*, whose white flowers are just coming out, we took a number of the Buprestis beetle *Stigmodera vittata*. *Grevillea aquifolium*, or Holly-leaved Grevillea, was in fine flower, and from this we were very pleased at securing two species of Symphyletes, viz., *S. farinosus*, and one of the name of which we are doubtful. Unlike most beetles, which are easily shaken off, these stuck most strongly to the slender branches, and had to be pulled off. As they are very similar in colour to the branches, it was a by no means easy task to catch sight of them, but it was easy indeed to miss them. Two Longicorns which we here captured deserve special notice. One is, we think, a species of Uracanthus, about an inch long and of a greyish-brown colour. The elytra are very striated, and altogether it is very unlike any other Uracanthus we possess, and we are therefore in hopes it will prove to be a new one. This was shaken off the *Acacia brachybotrya*, of which a good many were growing hereabouts. The other was the pretty

blue and yellow *Earinus kreusleri*, and was taken clinging to the small dry twigs of the Baeckea. This beetle is, we believe, very rare—at all events, we have never before seen a specimen, and at first we thought it also might be new. One of the peculiar features of these sand hills is one of the Honeysuckles, *Banksia ornata*, which grows from eight to twelve feet high, in a regular round form, and is a most ornamental shrub. Growing about here was an abundance of *Ptilotus exaltatus*, with its large heads of a whitish colour fringed with pink; these when dried make fine vase ornaments. It grows from eighteen inches to two feet high. Shrubs seen here other than these above named were *Melaleuca wilsoni* and *M. uncinata* (the former being in flower), *Stackhousia flava*, and *Eriostemon stenophyllus*.

A few miles out of Dimboola is a small salt lake, and at the time of our visit the machinery for making salt, which had been unused for some time, was being got in order, with a view to an early resumption of operations. We tasted the water, and can say with truth that it is indeed salt, and should give satisfactory results to the manufacturer. Growing around the lake are a number of the large Ti-tree, *Melaleuca parviflora*, or Paper Bark Tree, but they were not prolific of insect life—in fact, they possessed none at all. The country about here offers very little encouragement to the collector—at least judging so from the results of our labours all the way back to Dimboola; and we tried every source from which we thought insects might be obtainable. We did, however, secure a Frilled Lizard, *Grammatophora barbata*, but it escaped from its confinement during the night. Along the railway line, inside the fence, was growing some of the pretty grass, *Stipa elegantissima*, of which we took a good quantity, as it makes a very nice vase decoration. Whilst in Dimboola a peculiar kind of cold was prevalent, and the writer was unfortunate enough to fall one of the victims to it. It attacks the throat, and for a few days renders it very difficult, if not almost impossible, to speak, and one does not get over the effects of it for months. All the residents are convinced that it was solely attributable to the pollen of the Cape Weed, *Cryptostemma calendulaceum*, a plant the introduction of which has been attributed to the late Baron Von Mueller, but wrongly so, as we are informed it was found in Western Australia before he came to this colony. An enthusiastic and well-known botanical contributor to our club, Mr. F. M. Reader, resides here, and we spent a very pleasant and instructive evening with him. To say that we looked through all his large collection would be absurd—it would take days to do that—but we saw sufficient to satisfy us that of plants obtainable in the Dimboola district his collection is a perfect one. Mr. Reader very generously allowed us to take specimens from his entomological collection, and we thus obtained some beetles that are not only rare but new to us.

We left Dimboola on Wednesday, 31st October, for the Grampians, *viâ* Stawell, where Mr. Hewitt, a local photographer, and friend of Mr. Walter's, very kindly looked after our effects, and it was entirely owing to him that they reached us safely in the Grampians. Acting on Mr. Walter's advice, we did not take the ordinary road, but decided to follow what is known as the "pipe track," along which a walk of some 16 miles brought us to the foot of the hills, and another four or five miles over the hills to our destination, a farm house, where arrangements had been made for us to stay, for up to the present there is no regular accommodation for visitors.

Along the pipe track, which, by the way, covers the pipes which bring from the Grampians an unequalled water supply to Stawell, was plenty of *Styphelia sonderi*, and with its red flowers it formed a very pretty sight; also *Prostranthera denticulata*, with purple flowers; *Dampiera lanceolata*, having pretty blue flowers, and one of the Violaceæ, *Hybanthus floribundus*. Of *Leptospermum scoparium* we came across several small patches, but although well out in flower no insect life was on it. Neither were we more successful with the other shrubs in flower, but the leaves of the eucalypts yielded a few brownish-coloured Chrysomelas of the genus Cadmus. Signs of *Scolecobrotus westwoodii* were plentiful in the fallen branches of the eucalypts, and we secured a few specimens of the larvæ, one of which has since completed its metamorphosis and has emerged as the perfect beetle. Near the foot of the hills were acres of the *Leptospermum scoparium* in splendid flower, and looking just like an immense field of white, and we, of course, gave it a good trial, but scarcely a living thing was on it, except a number of small dipterous flies; only one beetle did we get from it, *Earinus mimula*, which may often be taken near Melbourne feeding on a similar plant. Here also were many fine specimens of the Grass-tree, *Xanthorrhœa australis*, and feeding on these were a few Melolonth beetles of the genus Phyllotocus. Our ill success made us feel rather tired, and we were, therefore, not at all sorry to reach our destination, which we did at about seven o'clock.

For the next three days our attention was principally devoted to the turning of logs, both large and small, which we did to the extent of some hundreds, in search of a large Carab beetle, which we were most anxious to secure, and we are pleased to say our efforts were rewarded with success. Although this beetle has been taken before, we believe by the late Mr. D. Sullivan, of Moyston, who was a member of our Club, it has not been previously named, but Mr. T. Sloane, another member of our Club, who has become a recognized authority on Carabidæ, has now named it after me, *Morphnos bestii*. Most of our specimens did not attempt to escape, but two or three did, and their movements were uncom-

monly swift, so much so, indeed, that they succeeded in getting down their holes, from which we successfully dug them out. They have very powerful mandibles, and can give the skin a tight squeeze, but one not strong enough to penetrate through it—indeed, so far as we know, there is no beetle in Victoria able to do this. Under logs we also took some fine specimens of Notonomus, of *Sarticus discopunctata*, and of Adeliums, and of rarities one specimen each of *Eutoma tinctillata* and *Gnathoxys humeralis*. In the decaying portions of some logs on moist ground we secured several specimens of the small Lucanus beetle, *Ceratognathus niger*, both male and female, the former being easily distinguishable by its large mandibles. Here in the Grampians both Lepidoptera and Hymenoptera were also exceedingly scarce, and we saw very few, indeed, of either family. Snakes also were scarce, the only two being a fine black one, *Pseudechys porphyrhiacus*, and a very small one of the brown species, *Hoplocephalus superba*. With respect to snakes, at our last meeting Mr. Le Souëf mentioned that in the Mallee the Death Adder was more numerous than is generally supposed, as, owing to its sluggishness, it was often passed over. Possibly Mr. Le Souëf is right, but so far as our party was concerned, we looked very carefully, indeed, for snakes, and not one of any kind did we see in the Mallee. That snakes are there admits of no doubt, but the residents we spoke to on the subject all said they had never seen or heard of any large number.

The Grampians are always good for plants, and of these, therefore, we have a much better record. We saw *Melaleuca squamœa*, with its beautiful pink flowers, but one of the prettiest sights was the liliaceous plant *Calectasia cyanea*, with its lovely bright steely-blue flowers. Various Prostantheras were in flower, viz., *P. hirtula*, *debilis*, and *rotundifolia*, this last showing well with its purple flowers. The beautiful shrub, *Bauera sessiliflora*, confined almost exclusively to the Grampians, was also in fine flower. Amongst the Asters, *A. asterotrichus* and *A. huegelii* showed out well with their blue flowers, as did also *Pultenea rosea*, a rare leguminous plant, seen in Middleton's Gap, and only found on the highest peaks of the Grampians. *Helichrysum blandowskianum* was only just coming into flower, and at this we were much disappointed, as we were anxious to secure good bunches of these for decorative purposes, for which they are well adapted. On the flat, just before the entrance to Hall's Gap, thousands of these pretty everlastings were growing, and very nice their flower buds looked, the predominant white being well set off by the addition of the flesh tint. On the hills were a large number of the Mountain Pine, *Callitris cupressiformis*, and we carefully searched these for beetles and larvæ. Of beetles we secured only one specimen, and that was a small dead longicorn of a genus unknown to us.

Of larvæ we also secured only one specimen, which up to the present has not emerged, and we are more than doubtful if our curiosity as to what it would turn to will be rewarded. That in these pines there breed a large number of rare beetles we are certain, but they require such a deal of searching for that they must be left to those collectors with more time at their disposal and more suitable appliances than we possessed.

Of course we revisited many of the picturesque spots seen by the members of the Club excursion of 1891, such, for instance, as Venus Pool and Stony Creek and Silverband Falls. All of these, owing to the much heavier rainfall during the past winter, were far and away prettier than on our previous visit. We also visited the gold diggings at the head of Stony Creek, but saw only two men at work, and they informed us they were only making tucker, and intended very shortly shifting to a more likely field. Naturally the place is all cut up, and the water in the creek, which formerly was beautifully clear, was now all muddy. In a very few years the place will again be grown over and look its old self, but owing to the numerous holes that have been sunk, it will never be the same pleasant spot for excursionists.

Several of the D'Alton family still reside on the Grampians, and of course we paid them a visit, and equally naturally they showed us the same cordial hospitality they did previously. Mr. D'Alton, the author of the Stawell water supply, entertained us with some of his really meritorious poetic effusions, and by the Misses D'Alton we were shown many of their beautiful paintings of native flowers. The merit of these is so well known that they need no praise from us ; suffice it to say that the colours of the flowers are reproduced as naturally as it is possible to do.

Having decided to return to Stawell by the way we came—viz., by the pipe track—we started early on Thursday morning, the 8th November, and after getting over the hills, rested at the house of Mr. Greaves, whose wife offered us every hospitality. We were, however, anxious to be away, and therefore had to decline her cordial invitation to stay the day. We again tried the Leptospermum for beetles, but with no more success than on the previous trial, a week before. On a rather large area, over which a fire had raged last summer, our attention was drawn to what were apparently little sand-mounds, but on closer inspection these proved to be composed of wood castings, evidently thrown out by the larvæ of some beetle. Accordingly we made a diligent search, and discovered that the fire, which had completely burnt the upper portion of the Leptospermum bushes, had not destroyed anything below the surface, as the stumps were just beginning to spring again. Into these stumps the larvæ had entered, the little mounds showing the first portions of their operations ; they had then securely plugged the entrances and

rapidly eaten their way right down to the very end of the roots, these being about eighteen inches long. Unfortunately, we had no proper appliances for digging, and it was therefore only after a deal of labour that we made the discovery the larvæ worked so far down. We secured one specimen, but have little hopes of its coming to perfection, as, the soil being of a sandy nature, the lower portions of the roots are warm and moist, a condition in which it would be impossible for us to keep them. The larva was new to us, but it is evidently that of a longicorn. Similar mounds were also at the stumps of the burned Banksias, and we managed here also to get one larva, but we are sorry to say that, owing to the reason above-mentioned, it has since died. It is, of course, quite a common thing for beetles to breed in rotten stumps and logs, and even in sound ones, but never before have we noticed signs of their larvæ on the surface immediately above the living stumps, as above described. Sometimes a larva will eat its way down the centre of a small shrub or sapling, and when down to a little above the surface will work round until but a very small portion of the wood is left, so that a fairly strong wind will blow the upper portion over; meanwhile the larva has gone below the surface. This is a totally different proceeding to the other one we have endeavoured to describe. We also got several larvæ in the small dead branches of *Acacia diffusa*, but so far none of these have changed their state, and we do not now think they will emerge until next summer. On a recent inspection none were even showing signs of turning into pupas. Several eucalypts were well out in flower, but nothing was feeding on them, not even bees.

Although we had only been a week absent, what a change had come over the plants, of which so many were in flower on our journey outwards. Now the flowers had nearly all disappeared, almost the only one remaining being the Leptospermum, and even these became scarcer and scarcer the nearer we got to Stawell.

As already mentioned, the objects of our trip were principally plants and beetles, and we therefore devoted little or no attention to birds, but on various occasions we saw Black Cockatoos, *Calyptorhynchus funereus*, mostly in pairs, but at one spot we suddenly startled a flock of eight—indeed, we must have been within a hundred yards of them before they sighted us, a circumstance which, we think, is rather unusual with this ever-watchful bird.

Our return stay at Stawell was very limited, not sufficiently long to enable us to do any collecting, and having an invitation to pay a visit to Mr. G. Skyrme, the well-known vigneron of Great Western, we accepted his hospitality for a couple of days; but the locality is not a good collecting one. We certainly did not neglect giving it a trial, but our labours were not very well

rewarded, as in addition to a couple of the large Curculio, *Leptops tribulus*, which we got on the common wattle, we saw only some longicorns of the genus Phoracantha, which are plentiful enough nearer Melbourne, and of which therefore we did not take any. These were all taking shelter under the loose bark of the eucalypts. We left Great Western on Saturday, 10th November, and reached home the same evening.

Although our three weeks' trip was not a particularly successful one from a collector's point of view, we have no reason to be dissatisfied, and can only say that should opportunity offer we shall be glad indeed to make a similar one another summer, but would prefer a rather later start, say about the end of first week in November.

A BOTANICAL TRIP TO EMERALD.

By H. T. Tisdall and C. Wallis.

(*Read before the Field Naturalists' Club of Victoria*, 12*th August*, 1901.)

Emerald, though figuring largely on many maps of Victoria, is but the nucleus of a village. It is situated in the south-eastern portion of the Dandenong Ranges, about thirty miles east of Melbourne. Its railway station is the highest (1,045 feet) on the new Gembrook line, which commences at Ferntree Gully. This line is built on the narrow gauge system, and the passenger cars are an exact copy of an ordinary tramcar, only much simpler in finish.

The train meanders slowly through some lovely scenery, winding in and out, now round a spur from whence the whole country towards Western Port Bay can be viewed, and then turning sharply towards the head of some narrow gully which has a silver streamlet trickling down its bed, while its banks are clothed with a dense mass of undergrowth, from whence spring huge eucalypts, dominating the scene with their gigantic stems and massive boughs. The hillsides are much more sparsely clothed. Where the axe or fire has been at work the ubiquitous Bracken Fern has taken possession, and has completely covered their devastating effects. Elsewhere the graceful Hill Fern Tree, *Alsophila australis*, may be observed rising above the lower bushes of *Cassinia aculeata*, *Indigofera australis*, and a host of leguminous and other plants. Some magnificent specimens of Blackwood or Lightwood, *Acacia melanoxylon*, may be seen between Monbulk and Menzies' Creek railway stations. The principal gums observed were the Yellow Box, *E. melliodora*, Stringybark, *E. capitellata*, Messmate, *E. obliqua*, and White Gum, *E. pauciflora*.

Our trip was taken one day last May, and on arriving at Emerald station we found a friend waiting with a vehicle to take

us to his farm, some distance away. The road leads through the little township of Emerald, and thence for several miles through quite primitive country, being densely timbered on either side. The farmhouse is prettily situated on the side of a rather steep hill, at the bottom of which flows a lovely stream, one of the upper branches of the Cockatoo Creek. Within ten minutes we found ourselves in the primeval forest, where a beautiful spring of icy-cold water was bubbling up in the bed of a deep valley. It first filled a crystal well, and then went sparkling away merrily towards the main stream. The well was fringed with many kinds of ferns; amongst them we noticed the Maidenhair, *Adiantum æthiopicum*, the delicate fronds of the Batswing or Oak Fern, *Pteris incisa*, several kinds of Lomaria, the Shield Fern, *Aspidium aculeatum*, &c. Even old fallen trees had their half-decayed trunks made beautiful with patches of green mosses interspersed with grey and brown masses of lichens; amongst these were the fronds of *Polypodium australe* and of the creeping fan-shaped Spleenwort, *Asplenium flabellifolium*, generally found on rocks and stones.

The spring has never been known to fail, and during wet weather it must flow much stronger, for the bed of the stream was quite wide in places and covered with waterworn stones. Following its track we had to scramble our way beneath a mass of dense scrub completely arching overhead. The scrub was principally composed of Hazel, *Pomaderris apetala*, Musk, *Aster argophyllus*, the Mint Tree, *Prostanthera lasiantha*, the Blanket Tree, *Senecio bedfordii*, and the Valley Fern Tree, *Dicksonia antarctica*. When we arrived at the main stream we found it bordered with huge tufts of *Lomaria capensis*, *L. discolor*, and *L. lanceolata*. Amongst the very few plants in flower was *Bauera rubioides*, but its flowers were quite white, in consequence of the deep shade. The banks of the stream, which rose up so abruptly in some places that we could not climb them, were covered with a dense growth of *Prostanthera lasiantha*, which should present a splendid sight when in flower.

Under these trees was the home of many mosses, lichens, and fungi, the latter especially being in great profusion. Amongst those belonging to the family bearing a gill-like hymenium—the Argaricini—was a very uncommon species, *Craterellus multiplex*. This curious fungus bears several pilei, one over the other, putting one in mind of a dumb waiter. Professor Cooke only notices this fungus from Tasmania, but Mr. M'Alpine includes it amongst Victorian fungi. I found it some twenty years ago in a Gippsland mountain gully, but had not seen it since. Another Agaric, very noticeable on account of its colours, had a purple pileus, red stem, and bright yellow gills, but was of such delicate structure that it was destroyed before a drawing of it could be made. The tiny *Agaricus granulosus* was very plentiful,

as also *A. cerinus*, *A. nummularis*, and *A. clytocyboides*. Polyporei were also in great abundance, especially *Polyporus australis* and *P. cinnabarinus*. The curious family which has spines and teeth instead of gills or pores—the Hydnei—was well represented; generally speaking they are somewhat rare. The graceful Clavaria was seen everywhere, their coral-like stems variously coloured, some yellow, others bright red, more of a pearly-white.

A beautiful little fungus was fairly common, growing on decayed wood. It is of a lovely bright blue colour, and was sent to Europe many years ago for identification. Dr. Cooke considered it a Leptonia, but required further specimens for specific identification. These, however, have not yet been furnished, for in his work on Australian fungi no description of it is given. The nearest approach to it is the description of *A.* (*Leptonia*) *lampropus*, but this differs in many characters—it is not fleshy, it is striate, and it is not squamulose; and although *A. lampropus* is noticed as of a steel-violet colour, its habitat is quite different, as it grows on the ground in pastures, whilst our specimens were always found on decayed trees. Another species we found was *Calocera digitata*. These curious fungi seem to flourish in the Dandenong Ranges, where they grow to an abnormal size. In one of the Club's trips, on the 24th May, 1894, Mr. J. Gabriel found several specimens which differed slightly from Dr. Cooke's description of *Calocera digitata*, but not sufficiently to form a new species.

It is impossible by word-painting to convey the beauty of some of the patches of colour found on the banks of this stream. For instance, an old charred trunk of a giant gum-tree as a background, at its foot a surface composed of mosses, lichens, and Jungermanni, mixed with glistening white Agarics and yellow and red Clavaria. On the trunk were borne several white and coloured Polyporei, whilst in a deep cleft at the base a number of the beautiful cream-coloured Craterellus glistened against the burnt wood, the whole being surrounded by the bright green fronds of various ferns, and surmounted by a canopy formed by the branches of the Prostanthera, while far above stretched the huge limbs of some giant eucalypts.

In another place we noticed a very perfect specimen of what is called in Europe a "fairy ring." This was caused by a number of fungi growing in such a manner as to form a complete circle, the diameter of which was about six feet. Inside the circle the ground was quite bare, whilst outside it was covered with short grass and ferns.

Away from the stream the ground had been cultivated, but had soon relapsed into a dense thicket of huge bracken. Where still in cultivation it shows a rich chocolate soil, bearing volcanic character.

One day we went over the top of a hill which was of a sandy nature, where the native heath, *Epacris impressa*, was in full bloom, together with a number of other plants usually found in healthy ground. Passing on through Mr. Wallis's farm the country soon changed again to volcanic soil. Here we found *Pimelea axiflora* ; the Native Laburnum, *Goodia lotifolia*, " Prickly Moses," *Acacia juniperina*, and an old Gippsland friend, *Acacia linearis*. The Blanket Tree, *Senecio bedfordii*, was very plentiful, and on the banks of the creek were some splendid plants of that singular fern, *Osmunda barbara*, their bright glistening fronds being very conspicuous.

The stump of a magnificent gum tree is still to be seen here, which measures sixty-six feet round the base. Tufts of *Brunonia australis* were very common near the water. Here also the Native Mulberry, *Hedycarya cunninghami*, grows very luxuriantly. The wood of this tree in days gone by was greatly prized by the aboriginals, who made use of it in obtaining fire by friction. In places we noticed the burrows made by wombats ; judging by the numbers of holes seen there must be a great many of these animals in the neighbourhood. The Native Raspberry, *Rubus parvifolius*, was in full bearing, the fruit hanging in clusters from every cane. The wire grass is a great nuisance in the district, sometimes making the scrub quite impassable. On the south side of the creek the hills rise more gradually, but the ground is rocky and gravelly. Here a few plants of *Correa speciosa* were in bloom, together with several composites. Though our record of plants in bloom is not large, the district is one which will amply repay the botanist for a visit, especially in the early spring.

"THE EMU."—We are in receipt of the first part of a new Australian Natural History magazine—" *The Emu* : a Quarterly Magazine to Popularize the Study and Protection of Native Birds : Official Organ of the Australasian Ornithologists' Union." The magazine is well got up, and the cover is adorned with an excellent process engraving of an Emu and clutch of eggs. The contents consist of an introductory article giving a brief history of the origin and founding of the Aust. O.U., and showing its objects and aims. Mr. D. Le Souëf follows with an interesting article on " Emu Feathers," in which he shows that the Spotted Emu, *Dromœus irroratus*, Bartlett, of Western Australia, cannot from its plumage be regarded as a distinct species. Unfortunately the plate illustrating the article is marred by an unsuitable background. Mr. Robert Hall shows that *Petrœca ramsayi*, Sharpe, should be regarded as a variety of *P. goodenovii*, Vig. and Hors. A useful and pointed article on " Bird Protection " is contributed by Mr. Frank Littler, of Launceston, while a second on similar lines, by " Orchardist," entitled " Feathered Friends or Foes ? "

points out, among other things, how much more good than harm magpies are accountable for, and generally advocates greater protection to bird life. One of the co-editors, Mr. H. Kendall, contributes a somewhat laboured sketch, "Amongst Returning Birds." Mr. W. M'Ilwraith, of Rockhampton, reports that the familiar Black and White Fan-tail has taken up the duty of clearing infested cows of ticks in that district. Mr. Edw. A. Petherick, F.L.S., of London, forwards some interesting extracts from "Letters by James Backhouse," in which some notes are given of the bird-life of Port Phillip in 1837. Reviews and notes help to complete a thirty-two page journal in which bird-lovers will find much that is interesting, but we fear that the price at which the magazine is offered to the public will greatly limit its sale, and therefore its usefulness.

Sword-fish in Port Phillip.—A rare capture was recently made by some fishermen at Sandringham in the shape of a good-sized Sword-fish, *Xiphias gladius.* The specimen, which measured about seven feet in length, was very much injured about the body from wounds received during its capture, and the sword was also unfortunately broken off about 15 inches from the base. This is, I believe, the first record for this fish in Victorian waters. As is well known, the Sword-fish frequently attacks the whale, and, curiously enough, its capture occurred about the same time as the announcement of the presence of a large whale and calf in the bay.—Jas. A. Kershaw, National Museum.

Nature Study.—So much prominence is being given at the present time to the protection of our native birds that it is pleasing to note that the Education Department has arranged for the delivery of a course of six lectures on "Bird Life and the Birds of Victoria," to the teachers at the Training College, Carlton. This will be undertaken by Mr. Robert Hall, a prominent member of the Field Naturalists' Club, who is well known as an enthusiastic observer of bird life. It is hoped by this means to stimulate the interest of the school teachers in the birds of the State and their value to the agriculturist, &c., and that they in their turn will influence the pupils under their charge, and so check the inherent desire for the destruction of nests and eggs which seems to possess the mind of the average school-boy. [After delivering one lecture, Mr. Hall had to leave for Brisbane, sooner than expected, when Mr. D. Le Souëf kindly undertook to complete the series.—Ed. *Vict. Nat.*]

Personal.—We learn that Mr. Robert Hall, whose ornithological work is well known, has accepted a three months' engagement as assistant at the Queensland Museum, Brisbane, with the probability of an extension at the end of that time. We wish Mr. Hall every success in his new and, to him, congenial occupation, and feel sure that his absence from the monthly meetings and rambles of the Field Naturalists' Club will be noted by many of its members.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 14th October, 1901. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 80 members and visitors were present.

CORRESPONDENCE.

From Mr. C. W. Maclean, Inspector of Fisheries, asking for the Club's opinion on an application made to the Department by Mr. Jas. Cooper, bird dealer, for permits to procure certain kinds of the fauna of Victoria which are at present protected during the whole year. The President explained that the question had been fully discussed by the committee, who recommended the adoption of the following resolution :—" That this Club recommends that Mr. Cooper's request be not granted, as it believes that special permits can now be obtained, and any further extension of the present facilities for the capture of protected birds is dangerous, and likely to lead to their destruction."

Mr. G. Coghill moved the adoption of the committee's recommendation, which was seconded by Mr. J. Shepherd, who thought that the resolution might even have been more strongly worded, contending that permits should be granted only for strictly scientific purposes. Mr. E. Anderson, in supporting the motion, said that as the Club had always vigorously advocated the protection of the native fauna, it would be acting inconsistently if it did not strongly oppose the granting of permits as desired in the present application. The motion was carried unanimously.

REPORTS.

A report of the Club excursion from St. Albans to Deer Park on Saturday, 14th September, was read by the leader, Mr. F. G. A. Barnard, who said that an enjoyable ramble had resulted. Nearly forty species of wild flowers were noted, most of them in the railway reserve at St. Albans. During the afternoon a fair-sized Tiger Snake, *Hoplocephalus curtus*, was met with and killed.

A report of the excursion to Ringwood on Saturday, 28th September, was read by the leader, Mr. J. A. Kershaw, F.E.S.,

who stated that, anticipating a wet afternoon at the time of starting, it was decided by those present to change the locality to be visited from Lower Ferntree Gully to Ringwood. During the afternoon a fair number of birds, insects, and plants in bloom were noted, but nothing of special importance was collected.

Mr. G. Coghill reported that owing to the very wet afternoon on Saturday, 12th October, the excursion arranged for Ringwood and Croydon did not take place.

The hon. librarian reported the receipt of the following donations to the library :—"Report Department of Mines and Water Supply, Victoria," from the Department; pamphlets from the Department of Agriculture, Sydney; "Records of Australian Museum," vol. iv., No. 4, from the Museum; "Proceedings Linnean Society of New South Wales," vol. xxvi., part 1, 1901, from the Society; *Nature Notes*, August, 1901, from the Selborne Society, London; *Knowledge*, August, and *Science Gossip*, August, from the proprietors; "Annual Report of Smithsonian Institution," June, 1898, from the Institute; "Bulletin of American Museum of Natural History," vol. xiii., 1900, from the Museum; "Proceedings Academy of Natural Sciences, Philadelphia," part 3, 1900, from the Academy; "Proceedings Field Columbian Museum, Chicago," from the Museum; and "The Microscope and its Revelations," Carpenter (new edition), purchased.

GENERAL BUSINESS.

The president announced the death of Mr. J. T. Gillespie, who had been a member of the Club for many years, and had somewhat recently filled the position of hon. treasurer, which, owing to ill health, he had to relinquish, and referred to the esteem in which Mr. Gillespie was held by his fellow-members. On the motion of Messrs. A. J. Campbell and D. Le Souëf, the hon. secretary was directed to forward a letter of condolence to Mrs. Gillespie.

The president also spoke of the loss Australian natural science had sustained by the death of Prof. Ralph Tate, F.G.S., of Adelaide, an honorary member of the Club, and referred to the great amount of valuable scientific work done by Prof. Tate, especially among the recent and fossil shells of Australia. On the motion of Messrs. J. G. Luehmann, F.L.S., and F. G. A. Barnard, the hon. secretary was directed to convey the sympathy of the Club to Mrs. Tate and family in their bereavement.

Mr. A. J. Campbell asked the president the following questions, of which he had previously given notice :—1. What constitutes or what is the rule for priority of descriptions of new species? 2. His authority for his ruling on the question?

The president, in his reply, stated that there are several codes of rules dealing with the subject, and all agree that it is by priority of publication that a name is fixed, but that printing

in an ordinary newspaper is not recognized as publication by scientists.

PAPERS.

In view of the numerous exhibits of wild flowers it was decided, on the motion of Messrs. J. Shepherd and F. G. A. Barnard, to postpone the reading of the papers set down for the evening.

EXHIBITS.

By Mr. A J. Campbell.—Clutch of four eggs of the Blue Bald Coot, *Porphyrio bellus*, Gould, from Western Australia; egg of Narrow-billed Bronze Cuckoo, with two of the Ground-Wren, *Hylacola pyrrhopygia*, from the Mallee, Victoria.

By Mr. T. S. Hall, M.A.—Boobook Owl, *Ninox boobook*, Lath., alive, caught in the University grounds, Carlton.

By Mr. C. Walter.—Dried specimen of *Bidens cernua*, Lin., the British Nodding Bur-Marigold, collected at Snowy River, East Gippsland, by Mr. E. E. Pescott, not previously recorded for Australia.

WILD FLOWER EXHIBITS.

The following were the principal exhibitors of wild flowers:—

Mr. D. Best, about 30 species collected at Beaconsfield, including *Diplarrhena moræa*, *Lyperanthus nigricans*, *Glossodia major* (white), *Caladenia carnea*, &c.

Messrs. Barnard and Kershaw, about 40 species from Gembrook and Nar-Nar-Goon, including *Hibbertia serpillifolia*, *Bauera rubioides*, *Tetratheca ciliata* (white), *Pimelia flava*, *Aster myrsinoides*, *Dillwynia ericifolia*, *Styphelia ericoides*, *Sphærolobium vimineum*, *Pultenæa mollis*, *Dampiera stricta*, *Lyonsia straminea* (in bud), &c.

Miss Cochrane, about 40 species from Sandringham and Ringwood, including *Prasophyllum patens*, *Thelymitra antennifera*, *Caladenia suaveolens*, *Utricularia dichotoma*, *Comesperma ericinum*, *Aotus villosa*, *Hibbertia diffusa*, &c.

Mr. G. Coghill, about 70 species from Croydon and Ringwood, including *Polypompholyx tenella*, *Acacia stricta*, *Viola betonicifolia*, *Diuris pedunculata*, *D. palustris*, *Pultenæa dentata*, *Thelymitra flexuosa*, &c.

Messrs. C. French, jun., G. E. Shephard, and C. Walter, about 80 species from Somerville, including *Eucalyptus gunnii*, *Bossiæa prostrata*, *Limnanthemum exaltatum*, *Leptospermum myrsinoides* (pink), *Epacris obtusifolia*, *Thelymitra carnea*, *Microtis atrata*, *Prasophyllum fuscum*, &c.

Mr. A. Paul, about 30 species from Grantville, including *Persoonia juniperina*, *Leptospermum myrsinoides*, *Epacris obtusifolia*, *Tecoma australis*, *Pittosporum undulatum*, *Clematis aristata*, *Pultenæa scabra*, *P. daphnoides*, *Caladenia cairnsiana*, &c.

Messrs. Tovey and Audas, about 50 species from Dandenong

Ranges and Cheltenham, including *Acacia leprosa*, *Grevillea alpina*, *Glycine clandestina*, *Duiris longifolia*, *Indigofera australis*, *Caladenia suaveolens*, *Goodia lotifolia*, &c.

After a lengthened conversazione the meeting terminated.

SOME INDIGENOUS PLANTS NEW TO WESTERN AUSTRALIA.

By W. V. Fitzgerald, F.S.Sc. London, F.R.H.S. England.

(Communicated by Robert Hall.)

(*Read before the Field Naturalists' Club of Victoria*, 10*th June*, 1901.)

Lobelia gouldii, n. sp.

A glabrous annual, stems branching and decumbent at the base, with erect or ascending stems, stout, rigid, triangular or winged, 2 in. to 4 in. high in the specimen seen. Radical leaves, none on specimen examined; stem leaves, lower ones deeply and irregularly toothed or lobed, ½ to ¾-in. long, obovate; upper ones small, linear, entire, 2 to 4 lines long, all dilated at the base, but not stem-clasping. Flowers large, violet, singly terminating long branch-like peduncles. Peduncles usually prominently two-winged. Calyx tube shortly turbinate, lobes linear, almost subulate, 4 lines long, exceeding the tube when in flower, equalling it when in fruit. Corolla ¾ to nearly 1 in. long, the middle lobe broadly obovate or obcordate, with a dark yellow blotch at the base; the lateral ones a little shorter and oblong, the upper ones very short, incurved, and more or less hairy. Anthers all tipped with a dense short tuft of white bristles. Capsule broadly obovoid, about 4 lines long, 2½ to 3 lines broad, slightly tapering at the base. Seeds small, ovate, dark brown, convex, prominently tubercular-rugose on the back, and with a prominent rib on the inner face.

Locality.—Between Mount Malcolm and Mount Leonora; L. H. L. Gould.

The systematic position of this species would be between *L. rhytidosperma*, Bentham, and *L. tenuior*, R. Brown, differing from the former chiefly in the more or less winged peduncles, and in the fruit; from the latter in the much shorter and broader capsule, and in the seeds, besides minor details.

Mr. Gould states the flowering period to be late in September, the plant flowering profusely, and forming large patches, in ferruginous, gravelly, or sandy soil.

Cakile maritima, Scopoli.

Rottnest Island, Fremantle, Bunbury.

Eryngium vesiculosum, Labillardiere.

Sparingly at Midland Junction.

Ophioglossum vulgatum, Linné.

Near Fremantle (rare).

THE OCEAN BEACH, SORRENTO.

By D. Le Souëf, C.M.Z.S.

(*Read before the Field Naturalists' Club of Victoria, 9th September*, 1901.)

The Ocean Beach at Sorrento is always a place of much interest to a naturalist, either in watching the mighty rollers coming irresistibly towards the shore, which, as they reach it, rear their mighty crests and curling over come tumbling down with a thundering roar, which seems to make the ground one stands on tremble ; or in studying the geology of the weather-worn cliffs ; or in watching the various sea birds searching for their food in the broken waters, or perhaps casting their keen eyes along the beach, as they fly overhead, for any food that may have been thrown up by the waves.

As the tide recedes it leaves barriers of rock exposed, and in the various pools of crystal-like water may be found many examples of small fish, crustaceans, and seaweed. Each pool is in itself one of Nature's beautiful pictures, while at the end of the reef, where the water is of a considerable depth and where the huge, long, trailing masses of Kelp are kept in ceaseless motion by the restless sea, larger crayfish and fish are to be found, and they can often be seen on or near the sandy bottom, where the Kelp is not so thick.

The cliffs of hard dune sandstone rock are fissured in all directions. The ceaseless action of the waves is slowly but surely wearing them away, faster in some places than in others, according to the resisting power of the cliffs. A sandy beach seems frequently to be a sign of a rising coast, and rocky cliffs of a receding coast line, where masses are continually falling, being undermined by the action of the waves ; but it is not an invariable rule, as, for instance, Albatross Island, out in the Straits, which is rising, yet for all that has a rock-bound coast without a particle of sand or beach, and no anchorage, but in course of time it may have both.

The dune sandstone reefs, which Professor J. W. Gregory says are post-eocene, are covered at high water, and they are exceedingly hard, probably owing to the mineral action of the sea water, and therefore they wear away comparatively slowly. In them, and well towards the outer edge, has lately been found the fossil remains of a large extinct kangaroo, which Professor Gregory has identified as belonging to the genus Palorchestes. Visitors as a rule would never think of looking for fossil remains in these rocks ; however, this specimen is plainly visible in the stone, but is only exposed when the tide is well out. The white bones stand out clearly in the dark rock.

It is often surprising to see what immense power the waves have ; for instance, a block of stone weighing about four tons, and which was well in towards the shore, had been lifted up and

moved several feet by the waves. In the hard stone one frequently notices small holes, sometimes very numerous, and almost honeycombing the rock in places. They were apparently filled with a much looser material than the surrounding rock, which was easily washed out by the action of the sea. They seem to be the former burrows of the Sand-hoppers, *Talorchestia pravidactyla*, which are exceedingly abundant in the sand on the sea coast in the present day, and no doubt they were equally plentiful in the ages gone by when this sandstone was forming. In the cliffs, where the sand is much more consolidated than it is in the sand hummocks above, the holes of these little crustaceans will be seen. Many of them will be found empty, but some are inhabited, while others contain only the dried skins of the former occupants ; these are generally in the extreme end of the burrow. As a rule the holes are made in colonies, often several hundred yards from the sea, and, being in consolidated sand, gradually get filled by loose wind-blown dry sand ; thus many would probably have only their entrances blocked, and when the sand is hardened into rock the contents of the burrows would be easily washed out by the sea, as they appear to be in the stone at the water level.

The cliffs facing the sea are often very interesting, as below at the sea level is the hard sandstone, a little higher up is consolidated sand and half-formed dune rock, often mixed with bands and deposits of limestone, and on the top the ordinary dunes of sand, which are generally covered with dense vegetation. When this growth gets destroyed by fire or other means, the wind blows the unprotected sand into hummocks or dunes of varying sizes, often making deep gaps in the more consolidated sand by so doing, and frequently exposing the dead roots of former vegetation, which have become encrusted with lime and sand. Some of these incrustations are of fair size, while others are very fine and delicate in structure, and when broken they, along with the shells and pebbles, find their way to the bottom of the hollows formed, and, being heavier than the sand, do not so easily get blown away. Many of these incrustations are hollow, through the roots having rotted away, but others have the roots still in them. A recent paper (*Victorian Naturalist*, xvii., p. 47) by Mr. T. S. Hall, M.A., gave some account of the formation of these incrustations.

In some places broken limpet and other shells are very plentiful, and all except the limpets more or less broken, giving one the idea that in days gone by the natives used these places to break and eat the shell-fish. This is more probable from the fact that stones are frequently found with them, that seemed to have been used for the purpose of breaking them.

The shifting sand hummocks are often of a considerable size,

and engulf trees and other vegetation in their march, which is, of course, caused by the wind. For instance, a vessel that was stranded over one hundred years ago on the coast near Warrnambool is now so completely buried by the sand that, although considerable search has been made for it of late years, the exact whereabouts of the vessel cannot be found ; it is supposed, however, to be now some distance inland.

The Sand-hoppers, *Talorchestia pravidactyla*, are very numerous and it is very interesting to watch their habits, especially during the summer months, for during the cold winter weather they are very sluggish and do not often appear. They form the favourite food of the Hooded and other Dottrels that frequent the sea coast. These lively little crustaceans prefer keeping just above high-water mark, but when the tide is out they often burrow in the sand nearer the sea. However, the incoming tide drives them back again, and if a wave comes up higher than usual to where they are congregated under the sand, they come out in a hurry and go helter skelter, as fast as they can jump, to higher ground. They seem to have a strong aversion to being caught by a wave. As a rule they live from four to seven inches from the surface, but they are fond of congregating in the damp sand under bunches of dead seaweed that lie on the surface just above high water mark. The Dottrels know this habit of theirs, consequently you see them go from one bit of seaweed to another and turn it over on the chance of getting a dainty morsel. One would think that the Sand-hoppers would choose a safer place by this time, as countless thousands must get eaten every year by birds from under the seaweed. Their food consists occasionally of carrion that may be thrown up, but principally of the softer kinds of seaweed, especially the seed-tubes of Kelp, and that this is evidently their mainstay will be noticed from the fact that many of these tubes lying on the beach about high water mark have been almost completely eaten by these crustaceans. They, of course, attack the lower part that is half-buried in the sand, and crowding thickly under a piece, soon demolish it, unless a Dottrel discovers their whereabouts and quickly demolishes them instead. They seldom appear above the sand during the day, evidently fearing their enemies ; but as the shades of night come on the scene they will be noticed coming to the surface in countless thousands—or I may say millions—and it is then also that they chiefly feed. As before stated, they often have their numerous burrows in the hardened dune sand near the top of the cliff, as well as on the beach.

Along the beach dead Penguins, *Eudyptula minor*, are occasionally picked up, sometimes being washed up dead by the waves, but at other times they come ashore alive, but, being in very poor condition and evidently much enfeebled, soon die.

They probably feel their powers going, so if in the proximity of of land make their way to it and end their days in peace on the shore. Mr. T. Fowler picked up a dead Penguin on the Ocean Beach that had tried to swallow a Mullet which was too large for it and was consequently choked. The fish was half-way down the bird's gullet head first, but a fin had caught in the throat, which prevented it from being ejected.

On the piles of the pier and baths at Sorrento, and also on similar structures round Port Phillip Bay, Mussels, *Mytilus latus*, are very plentiful, but are apparently kept down to a great extent by a shellfish, *Purpura succincta*, which seems to feed on them. Nearer Melbourne, where children and others paddle about the piers at low water, these shells are collected, consequently there the mussels are much more plentiful, not being preyed on, and it is astonishing how quickly they will cover the piles in dense bunches between high and lower water mark. The Purpura shells grow to a fairly large size, and though plentiful on the piles cannot be easily detected, on account of the seaweed and other marine vegetation growing on them. The largest Mussels seem the first to be attacked, and after the shellfish has killed its prey—although exactly how it does it I am not yet in a position to state—it remains there until it has completely devoured the occupant, leaving the empty shell hanging loosely by the byssus to the pile, but the waves soon wash it off, and thus many of the piles have been nearly denuded of Mussels by these shellfish.

One is often struck how frequently in summer Swallows, *Hirundo neoxena*, may be seen flying about over the bay near the shore after their insect prey, presumably because the insect prey is there in the first instance. On one cold, windy day I counted one hundred and seventy of these dear little birds sunning themselves on the side of the baths which was sheltered from the wind; they were sitting in long rows, closely packed together, resting, and only a little way above the water.

[The paper was well illustrated by a series of sixteen lantern slides.—Ed. *Vict. Nat.*]

THE EFFECT OF SNOW ON EUCALYPTUS TREES.

By D. Le Souëf, C.M.Z.S.

(*Read before the Field Naturalists' Club of Victoria, 9th Sept.*, 1901.)

This winter there have been heavy falls of snow in many of the higher parts of Victoria. I purpose showing by illustrations the effect snow has on eucalyptus trees growing on the lower ranges, which only have snow on them in an exceptionally cold winter. Of course, in the higher mountains of Victoria, the upper parts are deeply covered with snow every winter, but there the trees are small, with their branches short and generally very twisted, which

enables them to withstand a great weight of snow and bend without breaking, but in the lower country it is otherwise.

Last June, in company with Mr. K. M. M'Kenzie and Mr. Glen Lewis, I was enabled to visit the Blue Ranges, near Taggerty, after a heavy fall of snow. These ranges, about 3,500 feet above sea level, seldom have snow on them, and I was told by local residents that none had fallen on them in any quantity during the last seven years. They were covered with fair-sized eucalyptus trees, wattles, and other vegetation, with occasionally large bosses of dacite. We ascended one of the spurs, and when about three-quarters of the way up snow was first encountered. It lay on the ground about four inches deep, and bent down the heads of the tough bracken fern, and as we rested for a time we heard the beautiful clear notes of the Lyre-birds, *Menura superba*, in the deep gullies on either side of us.

As we ascended the snow gradually became deeper, and the ferns and other vegetation on the ground were entirely covered with a beautiful snowy mantle. When about 3,000 feet up snow was noticed on the trees, lying along the surface of the larger branches, and as we ascended it gradually became more plentiful, not only covering the tops of all the branches, both large and small, but also enveloping the bunches of leaves, so that as they hung down they had the appearance of huge white blossoms. The trees at the top of the range were practically covered with snow, for on one side the trunks, right up from the ground, as well as the branches and leaves, were enshrouded in white, and when the sun shone out the scene was indescribably beautiful and dazzling. The photographs, however, fail to do justice to the beauty of the scene

But what a scene of desolation, as far as the trees were concerned, as the weight of snow held by the large bunches of drooping leaves had in most cases proved too much for the branch, and it had broken, giving the appearance of someone having climbed up the trees and cut each of the branches with a tomahawk on the upper side, so that they had fallen and hung by the splinters. There did not seem to be a tree but what had the greater number of its branches broken in this manner, thus being practically ruined. The ground also was covered with fallen green branches; some were lying on the surface, but the greater number were buried in the snow. Later on in the year, when the snow has all melted and the broken branches dried, the forest will have a very desolate appearance, with the ground covered more or less with dead branches and many of the trees dead also.

It was curious to see the effect the snow had on the young Wattle trees (Acacias). There were groups of them, of various sizes, up to about 15 feet high. The gradual accumulation of

snow on their feathery leaves had slowly but surely bent them right over, their heads lying on the ground and their trunks forming a bow. The snow then gradually covered them right over, and each tree was represented by a soft white mound. Of course, if not kept too long in that position, many will resume their uprightness, but some will never recover. At the time of our visit the thaw had set in, and we had to steer clear of the trees, as masses of snow and branches were continually falling.

All along the top of the range the snow was about 10 feet in depth, and, as the top was not frozen, it was very difficult to scramble along. One of us had a pair of top boots on, and as their owner drew his foot out of the soft snow he filled the upper portion of his boot at the same time; consequently we had to stop every ten minutes or so while the aforesaid boots were taken off and emptied.

The tracks of various animals, such as Dingoes, Foxes, Wallabies, and Wombats, were plainly seen in many places. The tracks of the Wombat were deep and broad, as, being a heavy animal with short feet, it had to beat its way through and consolidate the snow to enable it to get a foothold—a very laborious proceeding, consequently these animals did not stray far from their burrows. But the Wallabies find the greatest difficulty in travelling, as they sink so deep in the snow, and thus have great difficulty in jumping; when they have taken a hop, they stop and look round for a time, apparently to try and find a firmer foothold. Many of our smaller marsupials, such as the Dromicia (Flying Mouse), lie dormant during the winter, as well as snakes and other reptiles.

When the spring sets in, and the snow melts, there will probably be a considerable rise in the Murray River, which will mean that the various swamps along its banks will be filled, and consequently the various waterfowl will be enabled to breed again this season, as they did last. It is not often that there is enough water in the swamps to enable the birds to nest for two years in succession, for without plenty of water there is lack of food, both for parents and young.

[The paper was illustrated by a series of lantern views.—Ed. *Vict. Nat.*]

BOOK NOTICE.

A Monograph of the Erysiphaceæ. By Ernest S. Salmon, F.L.S. Memoirs of the Torrey (New York) Botanical Club, vol. ix., 1900.

This is a work of 292 pages, illustrated by 175 figures, and deals with a very important group of fungi, usually spoken of as "Mildews," which are parasitic in habit, and many of them of great economic importance. In a very lucid introduction the

family is defined and limited to six genera—viz., *Podosphæra*, *Sphærotheca*, *Uncinula*, *Microsphæra*, *Erysiphe*, and *Phyllactinia*. Then the morphology and life-history of the group are given. The superficial mycelium is attached to the host-plant by means of haustoria in the epidermal cells. The reproductive phase is characterized by the production of an oidium or conidial stage, adapted for rapid reproduction during summer and early autumn, followed by the perithecial stage, in which the asci containing spores are formed, and these resting-spores carry the plant over the winter. A rapid historical survey is made from the first mention of this group of plants by Linnæus in 1753, through the classic researches of Leveille, Tulasne, and De Bary down to the present time. The connection between host and parasite is next referred to, and the practice is condemned of making the connection of a parasitic fungus with a certain host-plant of specific importance. The number of previous species is considerably reduced from the fact that a wide view is necessarily taken of species, since a large mass of material from all parts of the world was available, and the principle is laid down that classification rests primarily on morphological characters. In the distribution of species of this family it is pointed out that while they have practically a world-wide distribution, their headquarters are in the North Temperate Zone. Only 5 of the 49 species are recorded for Australia, and it is interesting to note that a new species from New South Wales in 1899 (*Uncinula australiana*, M'Alp.) has also been found in Japan. The economic aspect of these parasitic fungi is not neglected, for, in addition to their life-histories as far as known, instructions are given as to the best methods of treating the various diseases caused by them. A detailed classification and description of the various species are given, with keys to the genera and species, so as to render recognition easy. The value of the work is considerably enhanced by the copious bibliography, together with a valuable host-index, and the nine plates containing 175 figures are models of clearness. In this volume all the principal facts connected with this interesting group of fungi are given, and no one who studies modern mycology, or is scientifically interested in the "Mildews," which so seriously affect the vine and the strawberry, the apple and the pear, the hop and the rose, can afford to dispense with it.—D. M'ALPINE.

THE BARON VON MUELLER GRAVE MEMORIAL.—His Excellency the Governor-General, Lord Hopetoun, has consented to unveil the memorial over the grave of the late Baron Sir F. von Mueller, K.C.M.G., in the St. Kilda Cemetery on Tuesday afternoon, 26th November, when a number of prominent citizens have signified their intention of taking part in the ceremony.

THE LATE J. T. GILLESPIE.—Since our last issue the Field Naturalists' Club has lost one of its pioneer members by the death at Malvern, on 6th September, of Mr. J. T. Gillespie, at the early age of 36. Mr. Gillespie became a member of the Club in 1884, taking part in the first "camp-out" at Olinda Creek, Lilydale, in November of that year, and, though latterly his business engagements allowed him little time for field work, he was always fond of it, especially with regard to oology. He was naturally of a modest and retiring disposition, and did not contribute any papers to the meetings, but in 1898 was induced to accept the position of hon. treasurer; however, owing to failing health, he did not seek re-election in 1900, and spent the winter of that year in Queensland, returning much benefited by the change. Unfortunately this was not permanent, and, though able to again visit the Club, for several months past had been an invalid. He was an adept at photography, and so late as June last won a gold medal for the best picture in the Sydney Photographic Exhibition, the study being a pair of Laughing Jackasses photographed at a brother member's house. That he was held in great respect by his employers, Messrs. Alex Cowan and Co., paper merchants, and his fellow-*employés* was shown by the large attendance at his funeral, at the Boroondara Cemetery, Kew, where also the Field Naturalists' Club was represented by several of the office-bearers and members. Among the floral tributes laid on the grave was a wreath from the Club, and one composed of wild flowers from Mr. and Mrs. C. French.

MEMORIAL TO THE LATE PROFESSOR TATE, F.G.S.—A fund is being raised for the purpose of providing some memorial to the late Professor Tate, of Adelaide. Mr. T. S. Hall, M.A., acting Professor of Biology, Melbourne University, has consented to act as hon. secretary for Victoria, and will be pleased to receive subscriptions towards the fund.

CENTRAL AUSTRALIA.—Professor Spencer, writing from Tennant's Creek (lat. 19½ S., long. 134 E.) on 6th September, says:—"We are getting on first rate. Have just had a very pleasant trip on horseback, with packs and a few well-greased natives, out east into the Murchison Range to see some of their sacred spots. In about 10 days we move away north to Powell's Creek, about 100 miles. It is getting decidedly warm, and before long we shall be right into the middle of summer weather, camped, I hope, somewhere beyond the reach of 'alligators,' not far from the Macarthur (flowing north to Gulf of Carpentaria)."

A.A.A.S.—The next meeting of the Association will be held in Hobart, Tas., commencing on Wednesday, 8th January. Mr. E. F. J. Love, M.A., hon. local secretary for Victoria, Melbourne University, will be glad to receive names of intending members for the 1902 session.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 18th November, 1901. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 50 members and visitors were present.

CORRESPONDENCE.

From Mrs. Tate, of Adelaide, thanking the Club for its letter of condolence on the death of her husband, Professor Ralph Tate, F.G.S.

REPORTS.

A short report of the Club's excursion to Beaumaris on Saturday, 26th October, was given by Mr. O. A. Sayce, who stated that the afternoon was devoted to the examination of rocks, &c., dredged from a small reef off Beaumaris, among which a number of crustaceans, &c., were found, but nothing of particular importance. Mr. C. French, jun., reported that during the same afternoon about 40 species of plants were collected about Beaumaris, among which were *Veronica gracilis*, *Patersonia glauca*, *Melaleuca ericifolia*, *Triglochin procera*, *Comesperma calymega*, *Pultenæa paleacea*, and *Pterostylis barbata*.

An interesting report of the "camp-out" at Gembrook, from 8th to 11th November, was read by Mr. D. Le Souëf, C.M.Z.S., who stated that some 18 members and friends took part, most branches of natural history being represented, and a most enjoyable as well as profitable time was spent during the four days' camp. Thanks to the exertions of Mr. A. Mattingley, one of the leaders, who supplied most of the camping outfit, and the many acts of kindness and assistance on the part of Mr. and Mrs. A. B. Backhouse and family, the success of the trip was assured. Detailed reports of the various objects collected were furnished by some of the members who attended, which showed that full advantage was taken of this opportunity to make themselves acquainted with the fauna and flora of this district.

At the conclusion of the reading of the report Mr. F. G. A. Barnard moved—"That a vote of thanks be accorded to Mr. and Mrs. A. B. Backhouse and family for their kindness and assistance to the members during the excursion; and to Mr. A. Mattingley for the use of the tents, &c., and his untiring assistance and concern for the comfort of all throughout the trip." Seconded by Mr. J. A. Kershaw, and carried.

The hon. librarian reported the receipt of the following donations to the library :—Reports from Department of Mines, Victoria ; "Proceedings Royal Society of New South Wales, 1900," from the Society ; "Proceedings Linnean Society of New South Wales," vol. xxvi., part 2, from the Society ; "Report on Iron Ore Deposits of New South Wales," from Department of Mines, Sydney ;" Annual Report Botanic Gardens, Sydney, 1900," from the Director ; "Annual Report Australian Museum, Sydney, 1900," from the Trustees ; "Proceedings Royal Society, South Australia," vol. xxv., part 1, 1901, from the Society ; *The Emu*, October, 1901, from the Australasian Ornithologists' Union ; *Knowledge* and *Science Gossip*, September and October, 1901, from the proprietors ; *Nature Notes*, September and October, 1901, from the Selborne Society ; Report of the American Museum of Natural History, 1900," from the Museum ; "Transactions of the Wisconsin Academy," vol. xiii., part 1, 1900, from the Academy ; "Proceedings of Academy of Natural Science, Philadelphia," vol. liii., part 1, from the Academy ; and "Minnesota Botanical Studies," July, 1901, from the Minnesota State Botanist.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Gustav Weindorfer, Austro-Hungarian Consulate, Flinders-lane, Melbourne, and Mr. A. D. Hardy, 127 Victoria-parade, Fitzroy, were duly elected as ordinary, and Mr. E. E. Pescott, Edward-street, Shepparton, as a country member of the Club.

GENERAL BUSINESS.

The President stated that it was proposed by the committee to adopt a suitable badge to be worn by members during the Club's excursions, as it frequently happened that new members attending were unable to distinguish their fellow-members among the crowds of people at the meeting places. A design had been selected by the committee, consisting of a leaf, surmounted with the letters F.N.C., and inquiries had been made as to the cost. It was found that this badge could be supplied to members, if sufficient were ordered, made of silver with blue enamel letters, at a cost of 2s. 6d. each. He thought, however, that the general meeting should express its opinion as to what form the badge should take.

The adoption of a suitable badge was generally supported by the members, and various suggestions were put forward by members. It was finally decided to leave the matter in the hands of the president and hon. secretary to choose the most suitable design submitted, and to refer it to a subsequent ordinary meeting.

The President stated that he had been appointed as local

secretary to receive subscriptions for the proposed memorial to the late Professor Tate, of Adelaide, and invited intending subscribers to send in their names to him.

Mr. A. J. Campbell gave a brief outline of the first general meeting of the Australasian Ornithologists' Union, recently held in Adelaide, which he stated was a great success.

The President drew attention to the next meeting of the Australasian Association for the Advancement of Science, to be held in Hobart, Tasmania, early in January next.

PAPERS.

1. By Mr. J. H. Maiden, F.L.S.—"On the Occurrence of *Eucalyptus dives*, Schauer, in Victoria." Communicated by Mr. J. G. Luehmann, F.L.S.

The author stated that, in working up the distribution of certain eucalypts, he had come to the conclusion that *Eucalyptus dives*, Schauer, was much more common in Victoria than was generally supposed, and that the trees of this species had usually been regarded either as *E. Sieberiana*, F. v. M., or varieties of *E. amygdalina*, Lab. Reference was made to a number of specimens in the herbarium of Mr. A. W. Howitt, F.G.S., from various parts of Gippsland, most of which he considered true specimens of *E. dives*.

2. By Mr. F. P. Dodd.—"Notes on the Queensland Green Tree Ants, *Œcophylla smaragdina*, Fabr. (?)"

The author gave a very interesting description of the habits of these ants, and their curious manner of using their larvæ in the construction of their leaf nests and "enclosures." He also gave a list of a number of butterflies and moths which inhabit these "enclosures" during their larval and pupal stages, and which are not molested by the ants, though other caterpillars, beetles, and especially other species of ants, infesting the same tree are attacked and killed.

In the discussion which followed, Mr. D. Le Souëf, C.M.Z.S., related some of his experiences with these ants, which he stated he had found extremely plentiful in Queensland, and were a great annoyance to the collector, whose specimens they soon destroyed if not placed in a secure position. The natives, he stated, frequently collected the nests, and by crushing them between their hands to extract the juices from the larvæ and washing them in water, made an acid drink of which they were very fond.

Mr. J. A. Kershaw, in congratulating the author on his paper, stated that this ant was no doubt the same as the Green Tree Ant of Ceylon, an interesting account of whose habits appeared in the Trans. Ent. Soc. Lond. for 1896, and which coincided in every way with those given in the present paper. It was

probably this species which was mentioned in Hawksworth's "Narrative of Cook's First Voyage to Australia," published in 1773, in which was narrated the peculiar manner in which these ants utilize the silk from their own larvæ to bind together the leaves of their nests, &c.

NATURAL HISTORY NOTES.

Owing to the lateness of the hour several natural history notes were postponed.

EXHIBITS.

By Miss S. Cochrane.—Oil painting of Field Naturalists' Club Camp at Gembrook, November, 1901.

By Mr. F. P. Dodd.—Specimens of Green Tree Ants, *Œcophylla smaragdina*, Fab. (?), with leaf nests, shelters, &c., including ordinary working ants and a queen (with wings torn or bitten off); also larvæ (two sizes), pupæ, ants with larvæ in the mandibles (taken in act of web-forming), larvæ of the geometer moth, *Euchloris hypoleuca*, and a Jumping Spider, in formalin solution (in illustration of paper), from Townsville, Queensland. See also exhibits, page 87.

By Mr. C. French, jun.—Specimens of new Saw Fly, *Phylacteophaga eucalypti*, Froggatt, destructive to young eucalypts, from Toorak, South Yarra, &c.; also eggs of Masked Plover *Lobivanellus miles*, from North Queensland.

By Messrs. S. W. Fulton and F. E. Grant.—Specimens of crustaceans *Astacopsis nobilis*, *Engœus fossor*, *Engœus*, sp., collected at Gembrook.

By Mr. J. A. Kershaw, F.E.S.—Entomological specimens collected at Gembrook.

By Dr. C. S. Sutton.—Plants collected at Gembrook.

By Mr. G. E. Shepherd.—Nest and eggs of Black Duck, *Anas superciliosa*, collected at French Island.

By Mr. G. Weindorfer.—Plants collected at Gembrook.

NOTE.—The exhibit from Mr. A. Paul, on page 103, should be from Mr. J. T. Paul.

After the usual conversazione the meeting terminated.

THE GEMBROOK "CAMP-OUT."

FOR Victorian field naturalists the King's Birthday (9th November) falls at an opportune time. A large number of the wild flowers are still in bloom, the earlier butterflies have not yet had time to become rubbed or worn, while the nesting of the birds affords opportunities to the ornithologist to study their habits at this interesting period, and, finally, the weather can generally be relied upon to provide days not too hot for collecting and nights not too

cold for camping out. Until the opening of the narrow gauge railway from Ferntree Gully, during the past summer, the Gembrook district was almost out of reach of the naturalist with only a brief holiday at his disposal. Now, however, in the course of a few hours he can reach the terminus of the line, about 40 miles E.S.E. of Melbourne, situated in the heart of the ranges, about 1,000 feet above sea level. Here, close at hand, is a reserve of nearly a square mile, with several beautiful creeks running through it, well timbered with fine forest trees, and with all kinds of shrubs and undergrowth. In view of the many advantages of the district it was therefore determined to try Gembrook as the locality for the 1901 "camp-out," and none of those who took part in it can have any cause to regret the committee's selection. Hearing so much of the enjoyable outing at Healesville last year, several ladies early announced their intention of making a short stay under canvas, and finally the camp was graced with the presence of five members of the gentler sex, who, with thirteen gentlemen, made up a total of eighteen, as follows:—Mrs. G. Coghill, Miss S. Cochrane, Miss Gabriel, Miss O'Rorke, Miss Wollen, Messrs. F. G. A. Barnard, A. Campbell, jun., G. Coghill, S. W. Fulton, J. A. Kershaw, — Mattingley, W. J. M'Caw, R. Russell, Dr. C. Sutton, A. Wollen, and G. Weindorfer, with D. Le Souëf and A. Mattingley as co-leaders.

The majority of the party left Melbourne by the early train on Friday morning, the 8th November, arriving at Gembrook at 12 o'clock. The weather being fine, the trip proved delightful, and the distant views of Western Port and other places from the new portion of the railway line were much admired, as were also the peeps obtained into the dense fern gullies, as the little train wound round their heads or ran alongside them. Then again, after passing for some miles through scrub-covered country, one suddenly came on cleared grassed land, crops, or orchards, and distant inland views of the ranges were generally to be obtained here which are otherwise hidden by the tall timber. The Gembrook station is practically surrounded by scrub, although just before reaching it one passes through a beautiful cleared property. On arriving at the station we found Mr. Gerald Backhouse waiting to convey all our numerous and bulky packages and luggage to the camp, about a mile distant, but we all walked along the shady road, and observed with delight the beautiful display of wild flowers in the otherwise rough bush. Tetratheca largely predominated, and its delicate pink and white flowers of varying shades, in such quantities, was a sight worth coming a long way to see, and our lady members could not help picking bunches, as they said, to decorate the tables.

On arriving at the camp we found that a site had been chosen and partly made ready for our reception by Mr. H. Shaw. The

tent poles had been cut and places cleared. After lunch the ladies went for a walk to a neighbouring farm, and the others set to work to erect the tents and otherwise fix up the camp, and long before nightfall everything was made ready, even to having our dining tent lighted with gas. There being six tents in the encampment, it presented quite an imposing appearance, as the paintings by Miss Cochrane and Mrs. Coghill plainly show. The site of the camp was in a slight hollow among tall, green timber, and about thirty yards from a cool, fern-shaded creek, where a capital bathing-place was made by forming a small dam across the stream, in which task Messrs. Fulton and Coghill displayed considerable energy.

As we were situated in virgin forest country our collecting ground lay all round the camp, and therefore we had not to go far afield to collect. So when a pair of Laughing Jackasses (Dacelo) made the forest resound with their unique musical efforts, at daylight on Saturday morning, the members were early astir, and, after coffee at 5.30, went out exploring until breakfast at 7. That meal being over, we strolled along the creek or about the forest collecting, getting more or less scattered as each pursued his favourite hobby; but all returned to lunch at midday, when we were joined by seven additional members and friends who had arrived by the midday train. The second contingent was also met by Mr. G. Backhouse, who drove the two lady visitors and the luggage to the camp, but the others walked by a shorter track through the bush. They, too, were loud in their praises at the beauty of the scenery from the railway line.

In the afternoon the ladies remained about the camp, sketching and collecting, while the rest of the party proceeded to the Cockatoo Creek, passing through, on the way, the splendid farm worked by Mr. A. B. Backhouse; and it was a pleasure walking over the well-grassed and cultivated land after going through so much forest country. The Cockatoo is a clear, fast-running stream, in which some of the members indulged in fishing, while others collected on its banks, among the thickets of tree ferns, &c. At 5.30 a start was made for the camp, which was reached soon after six. After tea the evening was occupied in arranging the specimens collected, and all seemed well satisfied with the work of the day.

On Sunday morning we were again awakened at daylight by the delightful concert of birds, and their clear voices from the trees and scrub around us seemed innumerable and impossible to describe. The bush seemed alive with them, and their presence added much to the enjoyment of our camp-out. Breakfast was rather later, and about 9 most of the gentlemen made a start for Mount Irene, about three miles away, on the Nar-Nar-Goon road, the ladies following on a hour later, being driven to the

foot of the hill by Mr. G. Backhouse, where the advance party was waiting for them.

The flowers again were a never-ending source of interest. Bushes of the brilliant orange-flowered *Pultenæa stricta* bordering one part of the road were a sight to behold, the masses of their highly-coloured flowers showing out well against the soft-looking foliage, and we wondered why this plant was not more cultivated, as it would hold its own anywhere. We reached our destination—the summit of a high ridge—in due course, and while having an *al fresco* lunch admired the superb view across to Western Port, with French Island beyond, on the one side, or Mt. Juliet and the neighbouring ranges on the other. After lunch we wandered about, either collecting or admiring the magnificent views from different points. Some of the party, desirous of further exploration, went down the steep hillside to a fern gully, and through some very rough country, striking the road again at the foot of the range, while the others saw the ladies safely into the conveyances at the foot of the mount and then walked back to camp. Including visitors, we sat down to dinner in the evening to the number of twenty-five.

Some heavy showers fell on Sunday night, but fortunately cleared off before the morning, and Monday was a perfect day, and found members early astir, and after breakfast at 6.45 a.m. collecting was done in our immediate neighbourhood. Mr. Fulton and Mr. Coghill, in their search for the Land Crab, *Engœus fossor*, had excavated a hole about 4 feet deep and 8 feet across, but were amply rewarded for their mining operations in capturing about 30 of these crustaceans or so-called "yabbies." They were also fortunate in securing specimens of another species in the creek, which they fished for with pieces of meat attached to a string or by bags with a meat bait at the bottom, and we hope to hear the results of Mr. Fulton's work in these crustaceans later on. We had lunch soon after midday, then the tent and luggage were packed up, and at 3 o'clock Mr. Gerald Backhouse came with his conveyance and took all the luggage to the station, and we followed on later, gathering bunches of coral fern and flowers on our way. The day being a public holiday, many excursionists had come from Melbourne, consequently we secured accommodation for the whole party in a covered truck, and had afternoon tea in that vehicle before the train left at 5 o'clock. The distant views as we returned seemed even prettier than on our forward journey, while the foliage at the crossing of the Monbulk Creek in the departing daylight was particularly charming. At Ferntree Gully a compartment was reserved for us, and we reached town about 9.30 p.m., after an exceedingly enjoyable outing, and we regretted that more were not able to join in the excursion.

Following the usual custom brief reports on the different branches of natural history in which observations were made are appended :—

ORNITHOLOGY.—Mr. D. Le Souëf, C.M.Z.S., reports that the following birds were seen and identified at Gembrook :—Kestrel Hawk (nesting), Boobook Owl, Powerful Owl, Pied Crow-Shrike, Grey Shrike-Thrush, Black-faced Cuckoo-Shrike, Caterpillar-eater, Scarlet-breasted Robin, Rose-breasted Robin (nesting), Blue Wren, White-shafted Fan-tail (nesting), Rufous Fan-tail, Black and White Fan-tail, Ground-Thrush, Brown Tit, White-browed Scrub-Wren, Spotted Ground-bird (nesting), Pilot-bird, Coachwhip-bird (nesting), White-backed Magpie, Butcher-bird, Yellow-bellied Shrike-Robin, White-throated Thickhead, Olive Thickhead, Yellow-eared Honey-eater, Crescent Honey-eater, Wood-Swallow, Fire-tailed Finch, Lyre-bird, Sacred Kingfisher, Pallid Cuckoo, Fan-tailed Cuckoo, Square-tailed Cuckoo, Narrow-billed Bronze Cuckoo, Black Cockatoo, Gang-Gang Cockatoo, King Lory, Crimson Parrakeet, Wonga-Wonga Pigeon.

ARTHROPODA—INSECTA.—Mr. J. A. Kershaw, F.E.S., reports that the entomological results of this "camp-out," as was the case with that of last year, were not so good as anticipated, owing to the date of the trip being fixed rather too early in the season for general entomological work. Insects were not scarce, but the number of species met with were very limited and were mainly well-known species. Of the Lepidoptera only one specimen of *Papilio macleayanus* was noticed during our stay, and not more than half-a-dozen specimens of *Epinephile abeona*. Two specimens of *Xenica hobartia* were seen, one of which was captured. These were taken on the top of a hill about three miles from camp, along with the skippers mentioned below. Of the blues, *Lycæna labradus* was, as usual, plentiful in the open patches, while of *Holochila erinus* several specimens were noticed. The only skippers noticed during the trip were *Hesperilla flammeata*, *H. donnysa*, and *Trapezites phigalia*. Among the moths one of the most common species met with was *Porthesia obsoleta*, which was to be seen flying about the camp as early as 5 o'clock in the morning, but disappeared again by 9 o'clock. Very few moths visited the lights at the camp at night. Examples of the following species were noticed during our stay :—Spilosoma glatignyi, S. obliqua, Mosoda consolatrix, M. servilis, Pinara cana (male), Pantydia sparsa, Istarva scitisignata, Hydriomena correlata, Euchœca rubropunctaria, Phrissogonus laticostatus, P. insigillatus, Nearcha buffalaria, N. subcelata, Darantasia flavicapitata, Epidesmia hypenaria, E. tryxaria, E. chilonaria, Taxeotis delogramma, Glyphipteryx chrysolithella, Gelechia aversella, Euchloris dichloraria, Idiodes apicata, Metasia homophœa, Dox-

osteres canalis, Tortrix glaphyrana, Bondia dissolutana, Philobota iphigenes, Pleurota brevivittella, Coesyra euchrysa, C. parvula, Eutorna pabulicola, Chrysoryctis fraudulenta, Ocystola malacella, &c.

Of the Coleoptera a good number of species were seen, but nothing very rare, the majority being common species. The following are some of the species collected :—Stenolophus dingo, Coptocarpus australis, Lepispilus sulcicollis, Macrogyrus rivularis, Xantholinus chloropterus, Pseudolycus luctuosa, P. marginatus, Cisseis acuducta, Cryptodus tasmanicus, C. paradoxus, Heteronyx pustulosus, Bolboceras kirbyi, Leperina adusta, Ipomoria tillides, Pempsamacra dispersa, Stenoderus concolor, Orthorrhinus cylindrirostris, Talaurinus impressicollis.

Orthoptera : — Blattidæ — Panesthia lævicollis, Oniscosoma castanea, Ischnoptera australis, and I. annulata. Achetidæ—Gryllotalpa australis, Er.

Neuroptera :—Ephemeridæ—Ephemera australis, Walk.

Hemiptera :—Dindymus versicolor, Ptilocnemus lemur.

Protracheata.—Peripatus leuckartii.

Crustacea.—Decapoda—Freshwater Crab, Astacopsis nobilis ; Land Crabs, Engæus fossor and Engæus, sp. ? Amphipoda—The terrestrial amphipod, Talitrus sylvaticus. This crustacean is said to form the principal food of the Lyre-bird, Menura superba.

Vermes.—The land planarians, Geoplana sugdeni, G. munda, G. mediolineata, G. hoggii, G. adæ. The nemertine worm, Geonomertes australiensis.

Botany.—Mr. F. G. A. Barnard reports that, though the floral display was in many respects very fine, the botanical results o the outing do not call for particular comment. Altogether some 60 to 70 species of plants were noticed in bloom. Perhaps the genus of which the greatest number of species was collected was Pimelia. Of this eight species were seen. Among them may be mentioned *Pimelia ligustrina*, noticeable by its robust growth and handsome appearance when in flower ; it seemed, however, to have a somewhat local distribution. *Pimelia flava* was in places abundant enough to add, as its name indicates, a yellow tinge to the scrub, and it has the advantage of lasting well when picked. Acacias were, of course, well represented, but, owing to their flowering season being past, only the merest scraps could be secured for identification, but at least 8 or 10 species should be procurable in the district. Another genus which is at home there is Pultenæa, but only *P. stricta* made any show, a number of bushes entirely covered with their deep orange flowers growing alongside the Nar-Nar-Goon road being worth a trip to see. A few scattered bushes of *P. scabra* were still in fair

flower, but *P. muelleri*, *P. gunnii*, and *P. mollis* were past their best. *Tetratheca ciliata* was everywhere, from the purest white through different shades of pink to deep magenta, but curiously enough the deeper shades, generally the most plentiful, were here the rarest. Another charming plant was also ubiquitous in *Bauera rubioides* (Saxifrageæ), and a prettier shrub when in bloom with its different tints of pink is difficult to find, while its flowering period seems to extend through many months. A straggling plant with flowers somewhat resembling Bauera, but of the deepest yellow, *Hibbertia serpillifolia*, was very plentiful; but perhaps the flower which attracted most attention, on account of its beautiful sky-blue flowers, was *Dampiera stricta* (Goodeniaceæ), which was in great abundance and in many parts gave a distinctly blue tinge to the undergrowth. Of its nearest allies, the Goodenias, there were several species, *Goodenia ovata* giving quite a yellow aspect to the waste land along the railway line. The order Araliaceæ was represented by *Panax sambucifolius*, a stately shrub or small tree, but it was not in bloom. *Astrotricha ledifolia*, belonging to the same order, was very common, and its greyish vestiture and blossoms were sufficient to add another tinge to many parts of the scrub. At first sight this plant greatly resembles the Zierias (Rutaceæ). The beautiful blue creeper, *Comesperma volubile*, was in most cases in fruit, but some good spikes of *C. ericinum* (magenta) were gathered. The Epacridæ were nearly over, but what a sight these hills must present in the spring, when *Epacris impressa*, from purest white to deepest crimson, is everywhere. *Styphelia oxycedrus* was quite over, but the last spikes of *S. ericoides* still retained their tiny flowers. Here and there *Clematis aristata* entwined the bushes with its sprays of creamy-white flowers, while *Leptospermum scoparium* (Myrtaceæ) was just bursting into bloom, with its pure white paper-like petals. A near relative, *Melaleuca squarrosa*, grew in abundance in the swampy parts of the creek, bearing its honey-scented bottle-brush flowers, and shedding its singular bark, composed of innumerable layers of material about the thickness of tissue paper. Of the Eucalypts only *E. Gunnii* and *E. amygdalina* were obtained in flower. Other than the Pultenæas and Acacias, *Platylobium formosum* seemed to be the only representative of the Leguminosæ. Among the Composites, the Musk, *Aster argophyllus* and *A. stellulatus*, called by Mr. Guilfoyle "the Snow-bush," were conspicuous by their panicles of pure white flowers, while *Cassinia aculeata*, in many cases with pink instead of white headlets, was very plentiful. The Hazel, *Pomaderris apetela*, was in full bloom, but the handsomer *Prostanthera lasiantha* (Dog-wood) was not yet bearing its sprays of violet-dotted labiate flowers. *Lyonsia straminea*, one of the so-called "Supplejacks," was climbing about the vegetation in the gullies, but its flowers

were out of reach, though from a plant growing over a fence a few flowers were obtained. The Sassafras, *Atherosperma moschata*, and Native Mulberry, *Hedycarya cunninghami*, were, of course, fairly plentiful, the latter being in bloom. The flowers of *Viola hederacea* were very common. *Billardiera scandens* (Pittosporeæ) with its pale green bell-like flowers, was fairly plentiful, while the Native Fuschia, *Correa speciosa*, was still in bloom. The red variety is said to grow in the district, but was not noticed. The singular plant *Amperæa spartioides*, with its inconspicuous flowers, was very common. A distinctly Australian order (Stackhousieæ) was represented by *Stackhousia linarifolia*, bearing spikes of creamy-white tubular flowers. The white star-like flowers of *Stellaria pungens* (Caryophylleæ) were plentiful. The Proteaceæ were represented by *Hakea nodosa* and Banksia. The Native Elder, *Sambucus gaudichaudiana*, seemed to prefer places recently burnt to send up its soft stems, bearing creamy-white globular flowers. *Senecio vagus* displayed its large yellow flowers in the densest parts of the scrub, but of the almost-universal Blue-bell, *Wahlenbergia gracilis*, only very poor specimens were noticed, while of the next order, Candollaceæ, only one plant of the Trigger Plant, *Candollea serrulata*, was seen, and that from the train. Coming to the orchids, the palm must be given to *Thelymitra aristata*, of which fine specimens were obtained on the Sunday, just the sort of day it delights in—a fairly warm wind and bright sun. *T. longifolia* and *Caladenia carnea*, the normal pink, and two varieties, the white and musky-smelling, were also collected. *Xerotes Brownii*, *Dianella longifolia*, with *Burchardia umbellata*, represented the Liliaceæ. That singular plant *Drosera binata* grew in a swampy part of the creek. Lycopods were represented by two species having very different appearances—the one, *Tmesipteris*, hanging from the stems of the Tree Ferns in the thick gullies, while *Lycopodium densum* was found in the scrub on a dry hillside. Of ferns about twenty species were noted, though none were of special importance. *Lindsaya linearis* was perhaps the one one would least expect to find in the district, while the King Fern, *Osmunda barbara*, *Lomaria capensis*, var. *procera*, and the Coral Fern, *Gleichenia circinata*, were the ones exhibiting the most luxuriant growth, though Bracken between six and seven feet high was passed. The full list is :—Hymenophyllum nitens (Filmy Fern), Gleichenia circinata (Coral Fern), Osmunda barbara (King Fern), Alsophila Australis (Hill Tree Fern), Dicksonia billardieri (Valley Tree Fern), Davallia dubia, Lindsaya linearis, Adiantum æthiopicum, Pteris aquilina, P. incisa (Bats-wing), Lomaria discolor, L. capensis, L. capensis, var. procera, Blechnum cartilagineum, Asplenium flabellifolium, A. bulbiferum, Aspidium aculeatum, Polypodium australe, P. pustulatum, P. punctatum. Comparing the botany of this outing with that of the

previous "camp-out" on the Watts, at Healesville, shows that the latter is first in the number of the rarer or more uncommon species; but from a floral point of view Gembrook is decidedly superior, and had the members visited the district a month earlier they would have been astonished at the sight it then presented.

We have again to thank Mr. A. Mattingley for his kindness in letting us have the use of his tent and camp equipment, and for the way in which he superintended the commissariat department, everything working without a hitch. Our thanks are also due to Mr. and Mrs. A. B. Backhouse and family for the way they studied our interests, both in conveying all our luggage to and from the station, and also driving our lady members to Mount Irene, as well as freely supplying us with milk, cream, and other welcome commodities; and also to Mr. H. Shaw, who so assiduously looked after our interests in the camp.—D. Le Souef.

ON THE OCCURRENCE OF *EUCALYPTUS DIVES*, SCHAUER, IN VICTORIA.

By J. H. Maiden, F.L.S., Director Botanic Gardens, Sydney.
(Communicated by J. G. Luehmann, F.L.S.)

(*Read before the Field Naturalists' Club of Victoria*, 18*th Nov.*, 1901.)

This species, to some extent, on account of the author's description of it as a shrub, has only recently been generally recognized, and in the *Victorian Naturalist*, xvii., p. 46 (July, 1900), I announced its occurrence in Victoria. I had received it in 1899 from Mr. C. Walter, who collected it in October 1898 in the Wandong Ranges, but I took no special note of the matter, as it did not occur to me that it had not previously been recorded from Victoria. In this specimen it is in flower while the leaves are in the stem-clasping stage, and strictly opposite, as is so commonly the case in New South Wales.

In conjunction with Mr. Henry Deane, I have been inquiring as to the range of *Eucalyptus dives*, Schauer, in New South Wales, and find it to be very considerable. Latterly, I have been inquiring into those species which are found in both New South Wales and Victoria, and I have come to the conclusion that *E. dives* has considerable range in Victoria also. Mr. A. W. Howitt, F.G.S., and I have for some years past discussed some puzzling members of the section Renantheræ, and I believe I am able to throw some light upon some trees which have been looked upon as aberrant forms of *E. amygdalina* and *E. Sieberiana*.

During my recent visit to Melbourne we again discussed the matter, and that gentleman having lent me some specimens, which I have been able to compare at my leisure with New South Wales forms, I am in a position to offer an opinion upon them.

And here let me offer a tribute of praise to Mr. Howitt's "Eucalypts of Gippsland" (Trans. Royal Society Vict., ii.), which I shall refer to presently. Mr. Howitt's descriptions are so clear and explicit that one is never in doubt as to the tree to which he refers; the application of the proper botanical names can be made when eucalyptologists have reached finality.*

We have now no difficulty in determining *E. dives* in New South Wales, at all events within a few hundred miles of its type locality, but the species varies somewhat in the higher mountains and plains near the New South Wales–Victoria boundary, and in Tasmania also, and this has given rise to some confusion.

The synonymy appears to be :—

E. dives, Schauer, in "Walp. Repert.," ii., 926.

E. dives, Schauer, in Woolls's "Flora of Australia," p. 241, and "Plants of New South Wales," p. 51.

E. amygdalina, Labill., var. *dives*, F. v. M., Herb., Melb.

E. amygdalina, Labill., var. (*b*), Howitt, *op. cit.*

E. Sieberiana, F. v. M., var. (*b*), Howitt, *op. cit.*

E. amygdalina, Labill., var. *latifolia*, Deane and Maiden (Proc. Linn. Soc. N.S.W., xx., 609).

E. dives, Schauer (*ib.* xxiv., 460.)

E. delegatensis, R. T. Baker (*ib.*, xxv., 305.

E. Sieberiana, F. v. M., Deane and Maiden (*ib.*, xxvi., 125).

The bark is an important character in *E. dives*, being of a subfibrous (Peppermint) texture. While this is very distinct from the normal "Mountain Ash" bark (*E. Sieberiana*), which partakes somewhat of an Ironbark character, it very closely resembles that of *E. amygdalina*, which has helped to cause many botanists to look upon it as a form of *E. amygdalina*. At the same time the bark character requires to be observed with some care, as that of *E. Sieberiana* sometimes exhibits a fibrous tendency, while that of *E. dives* is sometimes somewhat indurated.

Many of the Victorian specimens of *E. dives* are undoubtedly very close to *E. Sieberiana*, and sometimes it is almost impossible to separate then if mature leaves be alone available. If not too old, however, they may be readily separated by the strong aroma of *E. dives*. In fact, *E. dives* in the bush and in the herbarium brings itself under notice by its delicious aroma, and this may be referred to as its most obvious character.

The suckers of *E. dives* are broadish, sometimes very broad. The narrowest suckers or seedlings are not very far removed from the broadest form of those of *E. amygdalina*. As regards the seedlings of *E. Sieberiana* (*a*), Howitt, the true Mountain Ash,

* Mr. Howitt has been kind enough to read this paper, and his remarks will be found in the form of foot-notes.

Mr. Howitt (*op. cit.*, p. 94), has pointed out how close they are, and their differences.

The character of club-shaped buds must be applied with caution, as apparently common to the alpine form of *E. dives*, to *E. Sieberiana*, and *E. hæmastoma* also.

The affinity of *E. dives* in its alpine form to *E. obliqua* is not so close as to *E. Sieberiana*, but it is undoubted, and is not to be neglected. Baron von Mueller was even deceived by the resemblance.*

Its affinity with *E. regnans*, F. v. M., and *E. virgata*, Sieb., is less close still, but it exists, and space forbids me to go into the question at this place. It is very difficult to define the limits of a number of species of the Renantheræ.

Let us further consider *E. dives* in its affinity to *E. Sieberiana.* Following is what Mr. Howitt says of it under the name of *E. Sieberiana* (*b*) in his "Eucalypts of Gippsland" (Trans. Royal Society of Victoria, ii.) (I am responsible for the identification of this tree with *E. dives*) † :—

"*E. Sieberiana* (*b*) occurs only in the mountains above the limit of *E. Sieberiana* (*a*),‡ sometimes as low as 2,500 feet, but in other places, as on the summit of the Great Dividing Range at the sources of the Livingstone Creek, when *E. Sieberiana* (*a*) ceases at 3,000 feet, and *E. Sieberiana* (*b*) commences at 3,500 feet. It extends on the summits of the higher mountains, *e.g.*, the Bowen Mountains, near Omeo, and the Dargo High Plains, to about 4,500 feet. I estimate the height to which the tree attains as not exceeding 200 feet. The bark is fibrous, and rather like that of *E. obliqua*, but perhaps more flaky; it is persistent upon the bole, the upper part of which and the branches are smooth, but with much detached bark pendent from the forks and from the termination of the persistent bark. The seedlings of these two trees have much the same features, but that of the (*a*) variety is much darker, but otherwise no marked difference can be observed between the seedlings of these varieties. § The timber of (*b*) variety is of a light colour, long in grain, and remarkably fissile, yet elastic. It is not a heavy wood, and it seems

* To my mind the resemblance of *E. Sieberiana* (*b*) to *E. Sieberiana* (*a*) is far stronger than is that of *E. amygdalina* (*b*) to *E. obliqua*, which, however, is marked.—A. W. H.

† I do not say that your identification of my *E. Sieberiana* (*b*) with *E. dives* is not fully justified. But I am still somewhat in suspense. Assuming that it is so, however, I should then say that it bears the same relation to other varieties—*e.g.*, my *amygdalina* (*b*)—as *E. regnans* does to *E. amygdalina*, with which it was formerly united.—A. W. H.

‡ Normal *E. Sieberiana*, F. v. M.

§ I have observed a very characteristic difference between the seedlings of *E. Sieberiana* (*b*), *E. amygdalina* (*b*) (Yertchuk), and the broad-leaved mountain *amygdalina*, which I figured from Dargo.—A. W. H.

to me should be valuable for many purposes. About twenty years ago, at Omeo, I made a set of swingle-bars for a four-horse team from this timber, which stood work remarkably well, and one of which is still in use after much hard usage. I have also seen palings split from this tree over six feet in length, which were so clean that after being planed up they were used successfully as weatherboards. Locally the tree is called Woolly Butt, from the character of the bark, and also Mountain Ash."

Mr. Howitt states subsequently in a report :—"I have observed a slightly varying form of *E. Sieberiana* (*b*) growing on the summit of Mt. Macedon, where formerly it was used for milling purposes."

A tree known as Silvertop, Darlimurla, South Gippsland (H. Deane),* bark rough, resembling that of Stringybark; limbs smooth and white, hence the local name; a milling timber, posts and rails; appears to be *E. dives* also.

"*E. dives*, Schauer, was seen in moderate abundance near the first spring. The species has not previously been recorded for Victoria. There are dense forests of straight young trees, principally of Mountain Ash, *E. Sieberiana*, F. v. M., for the greater part of the ascent" (p. 46). Also *ante* (bottom of p. 45)—"the air . . . . is redolent of Eucalyptus, in this instance chiefly the pleasing-scented *E. Sieberiana*" (*Victorian Naturalist*, xvii., July, 1900).

The specimen of *E. dives* above referred to was in early fruit only and hardly glaucous. The specimens referred to as *E. Sieberiana* (and which I now attribute to *E. dives* also) were obtained from higher up the mountain, and are very glaucous.

These specimens from the upper part of Mt. St. Bernard have large sucker leaves, one in my possession and thoroughly dry measuring 10⅜ inches long by 5½ inches broad. This and the next three specimens are identical with *E. delegatensis*, R. T. B., and are the glaucous form common in the cold districts, which imperceptibly passes into the normal form. The type was collected on Delegate Mountain, New South Wales, and the same collector (W. Baeuerlen) collected it on the Snowy Mountains on dry ridges in 1890. These specimens, while from the New South Wales side of the Alps, are identical with specimens found on the Victorian side, and also with specimens of *E. dives* found near Goulburn, New South Wales.

(1.) Gum-topped Stringybark of Lake Sorell (Tasmania), T. Stephens.

Lower part of stem exactly like common Stringybark, but if

* This tree I have always claimed to be *E. Sieberiana* (*a*), known locally as Gumtop, Silvertop, and White Ironbark, unless it is the tree called "Yertchuk." Perhaps I am confusing your description with *E. Sieberiana*, which grows between Darlimurla and Boolarra.—A. W. H.

anything rather less furrowed, the bark being quite loosely fibrous and easily rubbed into what bushmen call "bulls'-wool."

(2.) Messmate (fibrous bark), Mt. Mueller, near Mt. Baw Baw, Vic., James Melvin, March, 1889.

(3.) Gum-top Stringybark, East Mount Field, 1,000-1,500 feet.

These three specimens are in the National Herbarium, Melbourne, and are identical with the Mt. St. Bernard specimens. Baron von Mueller labelled Nos. 1 and 2 *E. hæmastoma* (later on *E. obliqua*) and No. 3 *E. Sieberiana*—an excellent commentary on the difficulty of dealing with this alpine form, which difficulty I would submit is removed by looking upon it as a form of *E. dives.*

I now state that in my opinion certain Victorian Eucalypts referred to as broad-leaved forms of *E. amygdalina* are really *E. dives.* The matter has already been alluded to, the affinity of the two species being obvious. The leaves are more shiny and more coriaceous in most of the Gippsland specimens than is the case in *E. amygdalina.*

The following extract is from Mr. Howitt's "Eucalypts of Gippsland" (*op. cit.*, p. 84) :—

"(*b.*) The broad-leaved variety of *E. amygdalina.*

"In the mountains, and more especially in some of the Plutonic and Metamorphic areas, as at Dargo and the Wentworth and Omeo, there occurs a form of *amygdalina* which is to some extent distinct from the typical form referred to. I have not observed it at a lower elevation than 700 feet at Dargo, and it grows upon Mt. Livingstone at about 3,000 feet, which is probably near its upper limit. According to my observation it does not exceed 100 feet in height, and is more frequently under 50 feet. The bark is wrinkled, approaching to fibrous, and persists up to the smaller branches.

"The seedlings and young saplings have opposed sessile lanceolar leaves, which are, however, much broader than the ordinary form, approaching at times pointed ovate.

"The leaves when scattered are broadly foliate and unequal sided. The umbels, buds, and flowers are those of the typical form, but the fruit is much larger, and almost always ovate top shaped, with a flat or slightly convex margin, and a brown or brownish-red tint. The valves, as in the ordinary form, are small.

"It grows preferably upon the sunny slopes, from 700 to 4,000 feet." This form is figured at plate 8.

Following are some specimens in Mr. Howitt's Herbarium (nearly all from Gippsland, and many of them referred to in his work on the Gippsland Eucalypts), which I think are referable to *E. dives.* Some of the specimens are imperfect, and further investigation may show that they belong to allied species, but

the number is not many, I think, and the vast majority of them show what, in my opinion, is *E. dives.* As a student of Eucalypts for many years, I see difficulties in their classification now that were formerly hidden from me, therefore this contribution to a better knowledge of an important species is submitted by me with all deference, and in the hope that it may be useful and suggestive to Victorian botanists :—

101. Insolvent Track (doubtful).
102. Heath, Brodman's Creek.
103. Osler's Creek.
104. Monkey Creek, Sale and Port Albert road.
105. M'Alpine's Turn-off, Currajong road.
106. Boyle's Hill, near Reedy Creek road, South Gippsland.
107. Stradbrook.
108. Hill Top, Longford.
109. 22 miles, Port road, Short's.
110. "*E. amygdalina*, Wild Horse Creek Range; highest point where tree grows."
122. "Conglomerate Hill, Wild Horse Creek; leaves of tree slightly shiny, veins obscure."
111, 116, 119. Great Divide, Wentworth side. The ovate glaucous suckers precisely match those of *E. dives* from Wingello, New South Wales. Mr. Howitt's *Sieberiana* (*b*).
112. "Broad-leaved Peppermint," Buchan road; sucker leaves nearly orbicular.
113. Fred Smith. Bridge, Tambo road.
114. Creswick, pointed buds, in bud only (doubtful).*
115. Toongabbie cutting, Walhalla road.
117, 121. Dargo, Dargo High Plains, and Two-mile Creek, Dargo Plains. *Sieberiana* (*b*).
118. Mt. Livingstone, broad-leaf *amygdalina.*
120. "Mountain Ash," C. S. Holmes, Snowy Plains. *Sieberiana* (*b*).
123. Darraman, Port Albert road.
124. "*E. amygdalina.*"
125. Plains between Curram's and Four-mile Creek. The fruit with broader rim than usual, and with valves slightly exserted.

[Assuming that *E. Sieberiana (b)* belongs to *E. dives*, then your determination shows that this species is not only very widespread, but that it also has a number of well-marked varieties. This view would fall in with what I have maintained—namely, that the specific name represents a group of allied forms, the extreme of which again connect with other specific groups. My view has always been that it is the better course to preserve the "group name" and distinguish the varieties rather than to make new species.—A. W. H.]

* Yes, very doubtful, more resembling some of the forms of the mountain *amygdalina.*—A. W. H.

With regard to Mr. Howitt's note, we are quite at one in regard to the difficulty of dealing with some species of that genus. The boundaries and species, particularly in the Renantheræ, being frequently hazy, it is in the first place absolutely necessary to be sure of our type or "ideal" plant, and then one must take a philosophical view of the relations of the related forms or varieties we submit for inclusion with the type.

HINTS ON DRYING FLOWERS.

The following article from the pen of the Rev. F. H. Woods, The Vicarage, Chalfont St. Peter, Bucks, England, appeared in the September number of *Science Gossip*, and as it appears to contain some valuable hints on a difficult subject is reprinted for the benefit of those who may not have seen the original. He says :—

"Amateurs and even skilled botanists are often much disappointed at the shrivelled and discoloured appearance of their specimens. Experience, however, shows that, with proper means and sufficient care, both defects may generally be avoided. The secret of success lies principally in three things :—(1) Ventilation, with some degree of heat if possible ; (2) the use of *absorbent* cotton-wool ; (3) the use of acids when necessary.

"The first is pretty well known and practised by botanists, who use various sorts of ventilating appliances ; but a daily or twice daily change of papers thoroughly dried in the sun or before a hot fire is all that is really necessary. In the case of succulent flowers, like Blue-bells (wild Hyacinth), it is advantageous to place the specimens, properly protected, for a while, or even altogether, in the sun. By this method such leaves as those of Blue-bells may be made to preserve their colour.

"Very few specimens can be dried satisfactorily without the use of absorbent cotton-wool. This should be placed on both the leaves and the flowers. It prevents them from shrivelling and goes far towards preserving the colour of both. When used, too great pressure is not needed, and is indeed harmful. Specimens should on no account be bruised. Flower-presses of the clothes press type are an abomination. With cotton wool, specially prepared drying paper is quite unnecessary. There is nothing better than newspaper, foreign newspaper especially—the worse in quality the better for the purpose. Some flowers are too delicate for this method. I have obtained excellent results with *Oxalis acetosella*, by placing it between sheets of tissue paper, with just a suspicion of cotton-wool on the petals only. This plan is the best also with delicate ferns, which dry so rapidly that

ventilation is unnecessary, but perfect flatness essential. The use of cotton wool, with proper ventilation, in most cases, is quite sufficient for a very large number of flowers, especially yellow ones, such as Potentillas, Primroses, Buttercups, and several white flowers, such as Wood Anemones, and Water Ranunculus, which will keep their colour perfectly if dried rapidly and with frequent changes of paper.

"Here it may be well to mention the advantage of taking off on paper water plants like the Water Ranunculus and the Utricularias. The living specimens should be floated in water, a sheet of white or tinted paper being then placed underneath, and the whole plant carefully lifted so that the water gradually flows off, leaving the specimens with the leaves spread out on the paper. This is troublesome to execute, and requires some practice, but it is essential for success, as it is the only way of getting the dried specimens to resemble the living plant. With such plants cotton-wool is only necessary for the flowers. Several blue flowers, such as the Forget-me-nots and smaller Gentians, do very well with absorbent cotton-wool, but the colour of Campanulas usually goes, unless dried with considerable heat from the sun or by crossing with a warm flat iron ; yet even so it is often not permanent.

"Many flowers, especially those of reddish or purple tints, and several that are white, will not keep their colours if merely dried with cotton wool. Here the use of acids is imperative. Of these the best is sulphurous acid. Its use was first introduced into this country some years ago by Mr. Claridge Druce, F.L.S., an Oxford chemist, well known as the editor of the *Oxfordshire Flora*, and one of our leading field botanists. He received it from Dr. Schönland, and it had been previously used in the herbarium of the Berlin Botanical Museum. The proportions of the mixture, as prepared by Mr. Druce, are two parts of sulphurous acid, freshly prepared and of ten per cent. strength, with one part of methylated alcohol of about sixty per cent. strength. The methylation should be preferably with wood spirit, and not with mineral oil. The acid tends, in course of time, to become oxidised, and is then useless, so that it is best to get a small quantity every year.

"The use of the acid is simple enough. The flower should be dipped in the mixture for a few seconds, when the colour will rapidly disappear, leaving the flower white. It should then be carefully dried with blotting-paper, care being taken to remove all the acid without bruising the petals. It may then be pressed in the usual way. Cotton-wool should be used for the leaves, which are, as a rule, unaffected by the acid, and should not be dipped into it. When the acid is used, it is best to place cotton-wool only underneath the flowers, and above

them pieces of tissue or blotting-paper, cotton-wool frequently giving them a spotted appearance. The natural colour of the flowers begins to reappear soon after the acid has been removed, and returns completely in the course of a day or so. It is better to expose them for a few minutes to the air before pressing. The effect of the acid, besides temporarily bleaching the flowers, is to prevent the growth of fungus, which otherwise destroys the colour. The tint, when it returns, is at least comparatively permanent. I have by me specimens of Sweetbrier dried several years ago that are still quite bright. Even with the greatest care there must be inevitably many failures. So the collector must preserve a large number of specimens and select the best.

(To be continued.)

The Baron von Mueller Grave Memorial.—The monument erected over the grave, in the St. Kilda Cemetery, of the late Baron Sir F. von Mueller, K.C.M.G., for nearly 45 years Government Botanist of Victoria, was unveiled on Tuesday afternoon, 26th November, 1901, by His Excellency the Governor-General, Lord Hopetoun, in the presence of a large gathering of public and scientific men and personal friends. Among those present were Professor Kernot and Dr. Jamieson, representing the Royal Society; Mr. J. G. Luehmann, F.L.S., Government Botanist; Mr. W. R. Guilfoyle, F.L.S., Director of the Melbourne Botanical Gardens; Mr. J. H. Maiden, F.L.S., Director of the Sydney Botanic Gardens; Mr. M. Holtz, Director of the Adelaide Botanical Gardens; Mr. C. French, F.L.S., Government Entomologist; and Mr. D. M'Alpine, Government Vegetable Pathologist, &c. The Field Naturalists' Club was represented by the president, Mr. T. S. Hall, M.A., the editor of the *Victorian Naturalist*, and several other members. Speeches were made by several public men, but that by Professor Kernot may be quoted as embodying the feelings of most of those present. He said the deceased was a typical man of science, devoted to the pursuit of truth, without any thought of his own immediate gain. He studied the laws of Nature, which were the thoughts of God. It seemed as though there were no part of botanical science he had not touched. An earnest and hearty response had been made from all parts of the world to the appeal for funds for the erection of the monument to him who was one of the kindliest, most generous, and most simple-minded of men. Mr. J. H. Maiden said that only future generations would realize the greatness and value of Baron von Mueller's work. The monument is in the form of a tall column of polished stone, surmounted by an urn, and resting on a broad pedestal. A medallion in copper of the profile of the late Baron is let into the stone above the inscription.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 9th December, 1901. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 50 members and visitors were present.

CORRESPONDENCE.

From the Australasian Association for the Advancement of Science, inviting the Club to appoint delegates to the general council for the meeting of the Association to be held at Hobart in January next. On the motion of Mr. D. Le Souëf, C.M.Z.S., and Mr. F. Wisewould, Messrs. J. Shephard and H. T. Tisdall were appointed to represent the Club.

REPORTS.

A report of the Club excursion to Springvale and Mentone on Saturday, 23rd November, was given by Mr. J. A. Kershaw, F.E.S., who stated that, though a good number of specimens both of entomology and botany were collected, nothing rare was seen. Among the Lepidoptera—*Termessa nivosa*, *Dichromodes atrosignata*, *Scoparia philonephes*, *Hypertropha tortriciformis* (larvæ, pupæ, and imago), *Chrysoryctes irruptella*, &c., were taken, while in Botany specimens (in flower) of *Casuarina suberosa*, *Utricularia dichotoma*, *Drosera peltata*, and *Gnaphalium japonicum* were collected.

A short report of the excursion to Fishermen's Bend on Saturday, 7th December, was given by Mr. F. E. Grant. A number of the commoner species of shells, including *Myodora brevis* and *Corbula scaphoides*, were collected, and an interesting crustacean, *Hymenosoma australe*, Haswell, was found in the shallow water, which has not so far been recorded from elsewhere.

ELECTION OF MEMBERS.

On a ballot being taken Mr. A. Card, Church of England Grammar School, St. Kilda-road; Miss Bainbridge, Elphin-grove, Hawthorn, and Miss Wills, Barker's-road, Hawthorn, were duly elected as ordinary members; and Dr. Edgeworth Somers, Mornington, as a country member of the Club.

GENERAL BUSINESS.

The matter of the adoption of a badge by the Club was again brought forward, and a recommendation from the committee that a shell (the species to be determined later on) be used, was dis-

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cussed at some length, but was not accepted by the meeting. Various suggestions were made, but without any decision being arrived at. It was finally moved by Mr. J. Shephard, "That the matter be referred back to the committee and that they be asked to consider the adoption of a single green leaf as the badge of the Club." This was seconded by Mr. D. Best and carried.

On the suggestion of Mr. A. J. Campbell, members were requested to send in designs for an emblem and a motto suitable for the Club.

The great destruction of the Mutton-birds, *Nectris brevicaudus*, during the nesting season, owing to the wanton cruelty practised by a section of the egg collectors in opening the birds or squeezing them under foot to obtain their eggs and leaving them to a lingering death, was brought before the meeting by Mr. F. G. A. Barnard, at the instance of Mr. C. French, jun., who had recently visited Phillip Island, the principal breeding place in Victoria. Mr. Barnard proposed that the matter be brought under the notice of the Police Department. However, after some discussion, in which it was pointed out that notwithstanding the enormous numbers of young birds and eggs taken every year, no apparent diminution was noticed in the numbers of birds which annually visit the island, Mr. D. Le Souëf, C.M.Z.S., moved—"That steps be taken to have a close season proclaimed for the eggs of the Mutton-birds on Phillip Island," which was seconded by Mr. J. A. Kershaw, F.E.S., and carried.

Mr. F. G. A. Barnard further moved—"That the wanton cruelty to the Mutton-birds be brought under the notice of the Society for the Prevention of Cruelty to Animals," which was seconded by Mr. J. Gabriel, and carried.

PAPERS.

1. By Mr. O. A. Sayce, entitled "Dredging in Port Phillip Bay."

The author gave a very interesting *résumé* of his paper, embracing the results of a four days' dredging trip in Port Phillip Bay by himself and three other members of the Club. With the aid of a map the various localities and channels, principally near the Heads and Queenscliff, which were worked by the party were pointed out and described. A very interesting collection of specimens was obtained, including Sponges, Starfish, Echinoderms, Crustaceans, Worms, &c., many of which were exhibited on the table, and some account of their peculiarities given by the author.

The President remarked on the energy and care shown by the author and his colleagues in collecting and preserving the specimens obtained, and drew the attention of members to the need of workers in many of the groups touched upon.

2. By Mr. S. A. Le Souëf (communicated by Mr. D. Le Souëf, C.M.Z.S.), entitled "Descriptions of Some Mallophaga from Victorian Birds."

A brief outline of this paper, which was of a technical character, was given by Mr. D. Le Souëf. The author described nine species of parasites from Australian birds, and was congratulated on taking up the working of a group so long neglected.

3. By Mr. F. P. Dodd, entitled "Supplementary Notes on the Queensland Green Tree Ants, *Œcophylla smaragdina*, Fabr. (?)"

This paper, consisting of some additional notes to those read at the last meeting on the same subject, owing to the lateness of the hour, was taken as read.

NATURAL HISTORY NOTES.

Mr. A. E. Kitson, F.G.S., contributed a note on the habits of the Butcher-bird, *Cracticus destructor*, at Kongwak, South Gippsland, which followed the same practice as some magpies in darting savagely at passers by when in the vicinity of the nests.

Mr. Kitson also contributed a note on an unusual occurrence with the Common Opossum, *Trichosurus vulpecula*, in the same district, one which he disturbed while sleeping at the foot of a large hollow dead tree having retreated into one of a number of holes in the ground, instead of climbing the tree, as is usual with these animals.

Mr. A. Coles furnished a newspaper cutting dealing with an apparent remedy for the eradication of a moth known as the Pyrale, which has been working havoc among the vineyards of Beaujolaise, in France. The owners of the vineyards adopted a method of fixing acetylene lamps around their areas, the flames being exposed and the lamps placed over a bowl containing petroleum. Attracted by the light thousands of insects either perish in the flames or in the petroleum. It is stated that by using two lamps for eighteen nights 170,000 of these moths were killed.

Mr. D. Le Souëf, C.M.Z.S., mentioned that two pairs of Magpies had lately built their nests in the Royal Park, and also stated that a captive Nankeen Night Heron, *Nycticorax caledonicus*, at the Zoological Gardens, had killed and eaten recently an Australian Dottrel and a Quail.

The President, Mr. T. S. Hall, M.A., mentioned a case which he witnessed recently of the common English garden Snail, *Helix aspersa*, eating an earth worm.

EXHIBITS.

By Mrs. E. Bage.—Japanese dwarfed Pine Tree intertwined with a Maple.

By Mr. A. Campbell, jun.—Nests of the Rose-breasted Robin, *Petræca rosea*, and Rufous Fan-tail, *Rhipidura rufifrons*.

By Mr. A. Coles.—Lincoln Lamb with two heads and six legs, bred by Mr. Williams, Strathmerton.

By Mr. F. P. Dodd., in illustration of his paper:—Queen, larvæ, pupæ, and nests of *Œcophylla smaragdina*, also specimens of the Ants with larvæ in their mandibles, taken whilst in the act of web-forming; several Jumping Spiders; Moths, including *Euchloris hypoleuca*; cocoons of Eromene; specimens of Homoptera; eggs of *Arhopala eupolis*; Scale Insects, &c.

By Mr. C. French, jun.—Preserved larvæ of Victorian Moths, showing natural appearances; also Orchid, *Orthoceras strictum*, dark variety, in flower, from Cheltenham.

By Mr. G. E. Shepherd.—Native Axe and Sharpening Stones, from Somerville.

By Mr. C. Walter.—*Pultenæa laxiflora* and *Pultenæa villosa*, var. *glabra*, collected by Mr. E. E. Pescott in the N.E. District of Victoria, previously recorded only from the S.W. of Victoria.

By Messrs. O. A. Sayce, F. E. Grant, J. Gabriel, and J. A. Kershaw.—Specimens collected on dredging trip in Port Phillip Bay.

After the usual conversazione the meeting terminated.

NOTES ON THE QUEENSLAND GREEN TREE ANTS (*ŒCOPHYLLA SMARAGDINA*, Fab.?)

By F. P. Dodd.

(*Read before the Field Naturalists' Club of Victoria*, 18*th Nov.*, 1901.)

During my studies in the field of the Lepidoptera of this district, I occasionally turn aside to observe the wonderfully interesting Green Ants, which abound here in all the scrubs, but not in the forest proper. In writing this paper I regret exceedingly that I cannot deal with it in a more effective manner. I trust members will prove to be forbearing and overlook its shortcomings, of which I am thoroughly sensible. However, I am not without hope that the information now given may be considered of an interesting nature.

Having no literature in this place to refer to, I do not know to what extent the subject has been touched upon. Some years ago I read an interesting article upon the ants by Mr. Saville-Kent, but I have forgotten in which publication it appeared. He noted the manner in which they constructed their nests, which are composed of green leaves, drawn together and held securely in position by white web matter. Some of these nests are not above two or three inches in length, but their general size and shape varies from that of a cocoanut to that of a football. Occasionally the nests are irregular in shape, owing to the position of the foliage worked upon; some may be even two feet in length, but such are usually narrower in proportion to the smaller habitations.

The nests are divided into chambers, the walls being formed with web or leaves. Frequently several large nests may be seen on one tree, as well as numerous small "enclosures," which are referred to further on. Nest-building appears to be going on throughout the year. Several may be in progress simultaneously on one tree. It is astonishing what myriads of inmates these nests contain; many of the chambers appear to be almost filled with the ants and their pupæ and larvæ. A new nest may be torn open, and though many larvæ are present no queen can be discovered; perhaps the queen may be in a central nest; however, I have not met with one for many weeks. When a fresh habitation is ready it soon receives its quota of larvæ, which come from an older nest. The older nests are generally abandoned when the foliage becomes withered—leaves so bound up cannot keep alive for any length of time. These abandoned nests are conspicuous objects on trees which shed their leaves, but they soon fall to pieces. Reverting to the queens: at certain times several may be found in one nest; later on, during the wet season, these queens may be found singly throughout the scrubs in little retreats formed by a few leaves just held together. In these, no doubt, small colonies are soon formed, for I have observed larvæ therein at times, but during this period I am too busy in other directions to pay particular attention to the ants. So there is much information to be gathered concerning the queens—whether they live any length of time, or die at the approach of winter, leaving enough eggs to supply larvæ to the several colonies for some weeks, or even months.

The ants wage war upon almost all insects around them, caterpillars, beetles, and other species of ants especially; they will even attack and kill the great caterpillars of *Ornithoptera cassandra*. They never appear to touch dead lizards, snakes, and birds, &c. There are no food stores in the nests—a few fragments of beetles, perhaps, some brown or black ants, or a much-mauled caterpillar. Many of the ants may be seen with the abdomen somewhat distended, as with honey; this must be obtained from the various scale and other insects they fraternize with, for I have not seen them upon flowers.

It is decidedly interesting to observe the insects engaged upon the construction of their domiciles. If the foliage is large or stiff, scores or even hundreds of the ants may be required to haul a leaf down and detain it in place until secured, both operations taking considerable time. It is quite a tug-of-war matter to bring the leaf into position and keep it there. The insects holding it have a chain of two or three of their comrades fastened on to them, one behind the other, each holding its neighbour by its slender waist, and all at full stretch and pulling most earnestly. What a strain it must be for poor number one! When the leaf is far apart the

ants form themselves into chains to bridge the distance and bring it down ; many of these chains are frequently required for a single leaf. I have seen a large colony at work upon a new nest, and several of these chains were 3 or 4 inches long ; altogether there were many of them in evidence, some perpendicular, others horizontal. Up or along these living bridges numbers of other ants were passing.

Now for the web material used to build the nests. It is furnished in fine and delicate threads by *the larvæ*; moreover, I have only seen what appear to be half-grown examples used for the work—I have never seen a large larva being made use of. The soft and tiny grubs are held by the larger ants, who slowly move about amongst those pulling. Each grub is held by the middle, with head pointing forward, its "snout" is gently made to touch the edges of the leaves where they are to be joined, it is slowly moved backwards and forwards, and is undoubtedly issuing a thread during the operation, which adheres to the leaf edges, and eventually grows into the web. When this web is completed it must be composed of several layers to be strong enough for the purpose of securing the leaves. Whether the larva is an unwilling instrument or not in its captor's mandibles is a point which cannot be ascertained. Maybe it is, for it cannot be comfortable in such a position. However, it supplies the web; perhaps if it were not robbed of the web for the benefit of the community it would be enabled to spin a cocoon for itself, in which to undergo the delicate change into the pupa state, for I have never seen a cocoon, all pupæ being quite naked.

When contemplating the work done in these nests one cannot but marvel at the wonderful ingenuity displayed, or in endeavouring to form some idea of the vast number of larvæ which must be utilized to supply the connecting web even for a moderately sized nest, for with trees with narrow leaves, like *Eucalyptus tesselaris* for instance, many scores of leaves are required to form a nest, and each must be sewn.

Not only do these strangely used larvæ provide the web to build up the nests, but they are carried considerable distances to various branches, generally near the ends, and there they are induced to furnish material for forming shelters and retreats for various scale insects, "hoppers," and caterpillars, with which the ants fraternize. Upon a tree may be seen several of these enclosures, or a dozen, occasionally many more; as a rule a few leaves joined together. Upon large-leaved trees like *Careya australis* or *Eucalyptus platyphylla*, a single leaf doubled over and fastened down will form a sufficient cover. Upon pulling any of these apart a small flat scale in great numbers will be found adhering to the leaf. Upon another species of tree, Acacia say, perhaps "hoppers" only of a particular kind, with horned head, and their larvæ and pupæ. Often in company with this insect a

very much smaller hopper may be found (specimens of both sent). At times with both or either of these there may be a mass of scales and the scale-devouring larvæ, in their movable habitations, of the moth *Eromene coccophaga*. Where these ant enclosures are on a Burdekin Plum tree a second species of Eromene in a movable cover may be noted, but it does not fasten the skins of the scales on to same like *E. coccophaga* does. A third and larger Eromene is also admitted into the circle of the ants' friends, but it is not scale-devouring; it lives, always on ant-infested trees, under a tunnel composed of silk and fragments of bark, and feeds upon the green bark. These tunnels or covered ways are 3 or 4 inches long, and I have seen them literally covered with ants. The caterpillar utilizes this web to form a double-walled cocoon (specimen of moth and cocoon sent). It happens now and then that this insect may be amongst scales, and then he may be accidentally covered in if the ants indulge in any web-spinning.

Many of our native fruits and berries are infested with waxy scales, more particularly the Burdekin Plum, *Spondias pleiogyna*, and various kinds of Figs and Terminalias. Small bunches of these fruits will be webbed in by the ants, as leaves are not always available. Frequently the whole of the covering is done with web, which in these cases is extremely thin and delicate, and sufficiently transparent to admit of the insects within being plainly perceived. The heaviness of these fruits, and the frail nature of the texture enclosing them, preclude my sending any specimens for inspection.

There is a long, slender, pea-green geometer caterpillar permitted to enter the shelters, the moth of which is large and beautiful, and has been named *Euchloris hypoleuca*, by Mr. O. Lower, from a single female specimen submitted to him by Mr. G. Lyell. I have found in one shelter four of these caterpillars, two species of waxy scales, the green "hopper," and a cocoon of *Eromene coccophaga*, with innumerable ants. The geometer larva often abuses the hospitality extended to it by eating holes in the leaves of its retreat if they are young, and these holes are usually stopped up by the ants. Each enclosure or shelter has its quota of ants, nor do they abandon them whilst any of their charges remain within. The geometers are rarely seen out of these covers during the day, unless the weather should be dull or damp; they crawl out to the ends of the branches to eat the tender foliage, and pupate in a netted cocoon in the covers.

A small jumping spider is to be found on almost all the nests and in or on many of the enclosures. It appears to be quite at home with the ants, though it moves aside when one approaches closely in its direction. The female makes her webs and deposits her eggs in any of the crevices in nests or covers. I believe the spider does not prey upon the ants or other inmates of the enclosures, being merely there for protection. It hunts on the out-

side of the nests or in the foliage close by for mosquitos, &c. I have seen it approach and capture a mosquito. With the exception of the spider and a flat scale on the inner portion of the top leaves of the nests, it is unusual to find any of the insects enumerated in the ant nests proper. Once a single green geometer was found in an empty chamber near a nest entrance—maybe an apartment intended for visitors. I have taken home the geometers and cared for them most tenderly, but they languish in captivity, and I have obtained a very small percentage of the perfect insects, one of which is now placed before you.

The last of the ants' particular chums I shall deal with are the larvæ and pupæ of the handsome lycænid butterflies, *Arhopala eupolis*, *A. meander*, *A. amytis*, and *Hypolycæna phorbas*. The eggs are deposited on a tree where the ants abound. Several species of Eucalyptus and some kinds of Terminalia are frequently selected by the Arhopala butterflies, and Clerodendrons have an attraction for *H. phorbas*. The larvæ of the former twist or fold a leaf, and fasten it, so as to form a retiring apartment. In this pupation also takes place ; but the ants, with a view to make the chrysalids more secure, frequently do a little web-spinning as well, leaving but one aperture, through which the butterfly finds its way ; but, with all their attention, a rather large dipterous fly succeeds in depositing eggs on many of the larvæ. Owing to this parasite many of the pupæ may be found dead. These species usually feed and pupate alone, though always with a number of ants in attendance ; but *H. phorbas* larvæ and chrysalids may be found side by side, with a leaf or two and ant web enveloping them. The butterfly larvæ are never in the company of other insects, being in trees by themselves. Even though a butterfly fails to emerge the ants do not attempt to eat the dead pupæ.

Fortunately these green ants are not provided with stings like the fierce "bulldogs," "jumpers," "greenheads," and others, but their mandibles are exceedingly sharp, and when they take hold they hang on with great determination, and will suffer being squeezed or torn in two rather than let go. A single ant on the neck or up the sleeve can make himself decidedly disagreeable. So when one blunders against a big nest in the course of building, and fairly bristling with its workers, he has a lively experience, for the insects have a knack of falling upon an intruder and spreading themselves over him in a very short space of time. They never display the white feather. If they are disturbed in the least they assume most antagonistic attitudes, stand on their middle and hind legs, strike out with their forelegs and wave their antennæ, and plainly show that if they can get at anything molesting them they will give a good account of themselves. If a nest with only a sentinel or two in view is touched it is almost immediately covered with its inmates, all ready for a fight.

SUPPLEMENTARY NOTES ON THE QUEENSLAND GREEN TREE ANT.

By F. P. Dodd.

(*Read before the Field Naturalists' Club of Victoria, 9th December*, 1901.)

Since forwarding my notes in August I have paid much attention to the ants, and find that lately they are busier than ever in nest constructing, and that larvæ of all sizes, and pupæ, are in great numbers. In many nests larvæ and pupæ of queens are abundant. Some of the latter will probably reach the mature stage before the end of the month.

With regard to the ants' acquaintances, two other species of Lepidoptera are forwarded. These I have taken or reared frequently. The first, a pretty brownish noctuid, I have captured nearly always on trees in complete possession of the ants. Two examples during this week, one of which was perched upon a leaf within three inches of a body of ants forming a nest. If it were not a friend it would scarcely have been there. The larva is not unlike a centipede in appearance, and when progressing its many curious filaments are kept moving like the legs of that creature. To pupate it cuts through a portion of a leaf, which it rolls, and forms its cocoon within. The larvæ of the other moth (gn. and sp.?) I have always found full grown, and within an ant enclosure or nest. It pupates there under a thin web, which the ants could easily destroy. The moth varies in colour, several I have showing black markings. The geometer, *Euchloris hypoleuca*, I have found more freely during the past few weeks. Upon one tree, with young and succulent foliage, a large colony of ants was forming nests amongst the leaves. The caterpillars were much in evidence, and invaded these as fast as they were drawn together, and ate so many holes through that the ants abandoned the constructions and commenced others elsewhere. The caterpillars would follow and again perforate the intended dwellings. There were many of these empty skeleton nests. From the tree I took over 40 of the caterpillars, which, so far, are thriving, and I hope to rear a good series of this splendid moth.

In alluding to the ants' fighting attitudes, it was not stated (owing to length paper had run to) that the abdomen is raised considerably, and, at intervals, tilted forward; however, as many of the nippings I have had seemed to have been irritated by more than the mere mandibles of the insect, and scratches or cuts smarted very much during some of my researches, and, further, that I upon several occasions experienced severe stinging pains in the eyes, it appeared advisable to investigate the matter fully. Therefore it was with much astonishment that I found that the insect discharges a fluid with some force—not a mere drop, but a regular spray, which can be sent several inches straight *in front.*

It is directed over the ant's head by a forward jerk of the already raised and restless abdomen. To observe the spraying process to advantage it is necessary to hold the branch with the excited insects thereon up to the sun (late afternoon sun for preference), or to a bright light. I have taken several small nests home after knocking most of the ants off. When the insect bites it simultaneously turns its abdomen over its back and discharges the liquid on to the bitten spot; hence the unrest of one when stung on more tender parts than the hand, and where the biter cannot be quickly secured. No wonder the jumping spider evades this formidable ant—I do not know of any spider, beetle, mantis, &c., which preys upon *Æcophylla smaragdina*—nor is it strange, when a fight occurs between the green and another species, that the other fellow exhibits an early inclination to break away after tackling. I have seen several green warriors quickly put to flight a larger number of a yellow species, nocturnal in habits, which I had brought out of their domicile by breaking a hole through. Several of the yellow fighters were quickly captured and carried away.

HINTS ON DRYING FLOWERS.

(Concluded from page 130.*)*

"The acid answers extremely well with roses and orchids, including white species of each, which otherwise inevitably turn brown. The effect on the Butterfly Orchis is curious. The flowers lose their fleshiness, and get the appearance of white silver-paper. The tints, however, of the bracts and all the green parts of the inflorescence become a pale greenish-yellow, showing that the acid does affect the leaves of some plants, but not in the same way as the flowers. It is not easy to know except by experiment which white flowers require the acid; but in general it may be said that thin, quickly-drying flowers do not require it. In fact, with very thin flowers, such as in the genera Cerastium and Stellaria, its use is almost impossible, as the flowers would lose their shape irrecoverably. With some delicate flowers the only possible way of using it is to touch them with a fine camel-hair brush dipped in the mixture; then soak up the moisture at once with blotting-paper, and spread out the collapsed petals with a pin. It requires infinite patience and considerable practice; but I have succeeded very fairly in this way with *Geranium molle*, for example, which when dried in the sun with cotton-wool loses size and becomes too blue.

"The hints here given are the result of many years' laborious practice. My own herbarium is not large, probably not more than five or six hundred specimens in all, including British and foreign plants. I make no attempt at completeness, but every year dry some thirty or forty of those most interesting to me. I have

found, however, that with sufficient trouble I can make nearly all specimens beautiful and natural. I have so often been asked by my friends how I managed that I thought a larger public might be glad to have the benefit of my experience."

[We hope some of our botanical friends will put these hints in practice, and give the results when applied to Australian vegetation.—Ed. *Vict. Nat.*]

Helix aspersa carnivorous.—On a recent showery day I found an average-sized specimen of the introduced *Helix aspersa* actively engaged in eating an earth worm, which appeared to be dead, as it was quite motionless during the process. The worm, which was about a couple of inches in length, was disappearing into the snail's mouth at a comparatively rapid rate. When eating vegetable matter the snail, by the aid of its horny radula and jaws reduces its food to small fragments before swallowing it. Here, however, nothing of the kind was taking place. The jaws were working vigorously, and at each retraction a further portion of the worm disappeared, it was going down whole. The attack was begun at the head end, and the long projecting body of the worm brought back the memory of the smoking snail in "Alice in Wonderland," only in this case it was a cigar and not a hookah that was being enjoyed. Judging by the thickness of the worm, and the length of the projecting part, I must have arrived at the beginning of the feast, and in less than a couple of minutes all trace of the worm had disappeared. I am not aware whether the carnivorous habit is common in this species of snail, though many others are recorded as habitually living on a mixed diet. The rapid spreading of *Helix aspersa* and its large numbers show it to be able to assimilate a wide range of food material, and if it has taken to devouring earth worms, in this case also almost certainly an imported form, we have another reason for fighting against the plague, for the harm it does is indirect as well as direct.—T. S. Hall.

The Common Opossum, *Trichosurus vulpecula*, Ogilby.—Some time ago, while working through a large patch of Kangaroo-apple scrub, *Solanum vescum*, F. v. M., in the Kongwak district, I came upon several holes in the ground like those made by rabbits. As these rodents have not yet, fortunately, reached this part of Gippsland, I was at a loss to know what animal was using them. They were too small for wombats, and foxes in this district don't trouble about making holes in the ground, but simply take possession of hollow or rotten logs, tearing the decayed wood out of the latter. I went on my way pondering over this when a few yards further on I was startled by an animal that suddenly jumped up from under my feet. It turned out to be a large opossum, which had been sleeping at the foot of a large hollow dead tree. As soon as it woke up, instead of

climbing the tree it made its way direct for the holes by a series of clumsy, shuffling jumps, and disappeared in one of them. I know that opossums will adapt themselves to their environment, and in treeless districts will take up their abode in the ground, in stone walls, under rocks, in logs and log fences, but I have never yet seen one that ran away from a tree to go into a hole in the ground. It is probable that the animal lived there, but whether it made the hole itself or simply took possession of what some other animal had made I am unable to settle. If the latter, then probably what animal? Perphaps some other field naturalist will throw some light on the matter.—A. E. KITSON, Geological Survey Camp, Kongwak, South Gippsland. 15th November, 1901.

PERIPATUS.—In the account of the Gembrook camp-out in the *Naturalist* for December, 1901, p. 121, it is recorded that *Peripatus leuckarti* was obtained on that occasion. In Proc. Linnean Soc., New South Wales, 1895, pp. 172 and 195, it is shown that the common or larger Victorian Peripatus is not *P. leuckarti*, Sangar, but a species which, on account of its egg-laying habit, is named *P. oviparus* by Professor Dendy. Subsequently Professor Dendy proposed to erect a new genus, Ooperipatus, for its reception; and quite recently the same observer has found another species in New Zealand which he has named *O. viridimaculatus*. A fully illustrated paper on the genus Ooperipatus will, I am informed by Professor Dendy, be published by him in a forthcoming number of the *Quarterly Journal of Microscopic Science*. The only species of Peripatus other than *O. oviparus* authentically recorded from Victoria is the very much rarer *P. insignis*, Dendy, syn. *P. leuckarti*, var. *typica*, Fletcher. The latter has 14 pairs of walking legs, while *O. oviparus*, in common with the New South Wales species, *P. leuckarti*, var. *orientalis*, Fletcher, and the Western Australian *P. leuckarti*, var. *occidentalis*, Fletcher, has 15 pairs. As there has been a good deal of confusion in the past regarding the identity of the Peripati occurring in different parts of Australia, it is very desirable that there should be no doubt on this point when the finding of examples is recorded. Students of this interesting group would be gratified if the gentleman who is responsible for the record in the *Naturalist* abovementioned would examine his specimens and publish a note thereon. *O. oviparus* may be readily distinguished from other Australian forms by having 15 pairs of legs in addition to the one pair of oral papillæ, and by the presence in the female of a conspicuous fleshy ovipositor, which is usually extended when the animals are killed. Personally, I should be very pleased to have the opportunity of examining any specimens of Peripatus which members of the Club may meet with during their excursions.—THOS. STEEL, c/o Colonial Sugar Refinery Co. Ltd., O'Connell-street, Sydney.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 13th January 1902. Mr. O. A. Sayce (one of the vice-presidents) occupied the chair, and about 50 members and visitors were present, including a number of teachers attending the Summer School in Melbourne.

REPORTS.

The hon. librarian acknowledged the receipt of the following donations to the library :—"Report on the Walhalla Goldfield," from the Department of Mines, Victoria; "Proceedings of the Australasian Association for the Advancement of Science, Melbourne Meeting, 1901," from the Association; "Records of the Australian Museum," vol. iv., Nos. 2 and 5, from the Trustees Australian Museum, Sydney; "Proceedings Linnean Society of New South Wales," part 3, 1901, from the Society; "Queensland Flora," part 4, by F. M. Bailey, F.L S., from the Colonial Botanist, Queensland; "Proceedings of the New Zealand Institute," vol. xxxiii., 1900, from the Institute; *The Emu*, January, 1902, from the Australasian Ornithologists' Union; "Hawkesbury Agricultural College Magazine," Dec., 1901, from the College; *Nature Notes*, Nov. and Dec., 1901, from the Selborne Society, London; *Science Gossip* and *Knowledge*, Nov. and Dec., 1901, from the proprietors; "Annual Report of Smithsonian Institute," 1899, from the Institute; "Missouri Botanical Garden 12th Annual Report," from the Trustees; "Bulletin of Buffalo Society of Natural Science," vol. vii., No. 1, from the Society.

GENERAL BUSINESS.

The question of the adoption of a badge for the Club was again brought before the meeting. The chairman stated that the matter had been discussed at considerable length by the Committee, and various suggestions had been carefully considered, and that it had been finally resolved to recommend that the shell *Nassa fasciata* be adopted as the badge of the Club. It was pointed out that the shell could be worn permanently attached to the watch chain, which would serve to distinguish members of the Club, especially when travelling; and at excursions or meetings could be attached to the lapel of the coat by means of a small gold safety-pin. Samples of the mounted shells were submitted for the inspection of members present.

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Mr. H. T. Tisdall supported the recommendation of the Committee, and moved that the suggestion of the Committee be adopted. This was seconded by Mr. R. Hall. After a short discussion, in which Messrs. A. Coles, A. J. Campbell, D. Le Souëf, C.M.Z.S., and others took part, the motion was put to the meeting and carried.

The chairman stated that the adoption of a suitable motto had also been considered, but, in the absence of any suggestions, had been postponed for further consideration. Mr. F. G. A. Barnard moved—"That members be asked to send in suggestions for a suitable motto not later than 3rd March next." This was seconded by Mr. S. W. Fulton, and carried.

The hon. secretary reported that, in accordance with the resolutions passed at the previous meeting regarding the cruelty to the Mutton-birds on Phillip Island, he had interviewed the Secretary for Public Works, who informed him that steps would be taken to endeavour to prevent any cruelty to the birds in the future by having special instructions issued to the police stationed on the island to watch for, and take prompt action against, anyone found ill-treating the birds in any way. It was also probable that steps would be taken to compel all Mutton-bird egg collectors to take out a license, but the Department did not think it necessary to have a close season proclaimed for the eggs.

A letter was also read from the Victorian Society for the Protection of Animals, in which it was stated that the Society would be glad to co-operate with the Club in the matter, and forwarding a copy of a report from a police constable stationed at Cowes, which had been received by that Society, dealing with the complaints made regarding cruelty to the Mutton-birds. The constable in his report stated that during his visits to the rookeries during the past and previous seasons, he had not seen or heard of one act of cruelty to the birds, and that the matter had, in his opinion, arisen from unfounded statements made by unfortunate egg collectors to the effect that the fortunate ones "must cut the birds open and take the eggs out."

The hon. secretary, Mr. J. A. Kershaw, stated that there was undoubted evidence to prove that the cruelty complained of had been practised. Mr. C. French, jun., with other members of the Club, had found numbers of the birds which had been cut open and thrown aside under the bushes, and many of the birds were still alive when discovered.

Messrs. G. A. Keartland, A. J. Campbell, F. Wisewould, D. Le Souëf, and others also spoke strongly in support of Mr. French's statements.

Mr. F. G. A. Barnard stated that we had undoubted evidence in support of cruelty having been practised, and moved—"That a letter be sent to the Society for the Protection of Animals empha-

sizing the statements already made." This was seconded by Mr. D. Le Souëf, and carried.

The chairman drew attention to the presence of a number of State school teachers who were attending the Summer School instituted by the Education Department in Melbourne, and in a few suitable words welcomed them to the meeting.

Mr. H. T. Tisdall suitably responded on behalf of the teachers.

PAPERS.

1. By Mr. R Hall, entitled "Notes on a Species of Helodromas."

The author exhibited four Sandpipers he had received from N.W. Australia, which, though resembling the description of *Helodromas ochropus*, Temm., in the "British Museum Catalogue," were not sufficiently different to be regarded as a new species. The genus, however, had not been recorded from Australia, and it was therefore a new bird to Australian ornithologists.

Mr. A. J. Campbell stated that whether the species is new or not it is new to Australia, and in the winter plumage, which may account for its difference from the description in the "British Museum Catalogue." Messrs. G. A. Keartland, F. G. A. Barnard, and J. F. Haase also took part in the discussion which followed, the former stating that he had shot the bird when with the Calvert expedition in N.W. Australia, and it was, he believed the same bird he had seen at Heidelberg some years ago.

2. By Messrs. S. A. Le Souëf and H. Bullen, entitled "Descriptions of a New Mallophagous Parasite from Kangaroos." Communicated by Mr. D. Le Souëf, C.M.Z.S.

The authors described a parasitic insect found on the Kangaroo, &c., which was remarkable in being only the second two-clawed parasite found in a mammal, and though very similar to the sub-genus Menopon, entirely confined to birds, on account of its habitat they had considered it necessary to found a new genus, Heterodoxus, for it.

The chairman, Mr. O. A. Sayce, and Mr. G. A. Keartland made a few remarks on the paper.

3. By Mr. R. Hall, "Among the Birds of Western Australia."

The author, in a lengthy paper, described the ornithological results of a trip to Western Australia.

Messrs. D. Le Souëf, C.M.Z.S., G. A. Keartland, and A. J. Campbell discussed the paper.

NATURAL HISTORY NOTES.

Mr. J. A. Kershaw, F.E.S., read a letter which appeared in the *Argus* recently, complaining of the shooting of protected birds during the close season, and the want of action on the part of

the country police. The writer suggested that the Field Naturalists Club should take the matter up and endeavour to have a better protection afforded our native game.

Mr. G. A. Keartland mentioned a letter which recently appeared in the *Argus* regarding the killing of young quail, and stated that he had issued a large number of circulars to leading sportsmen in the State with a view of getting their opinions as to the most suitable time for the opening of the season, and hoped to be able to report the result shortly.

The occurrence of numbers of the Paper Nautilus, *Argonauta nodosa*, in Port Phillip Bay was mentioned, and the chairman gave a brief description of their structure, &c., in answer to some questions asked by some of the members present.

EXHIBITS.

By Mr. F. G. A. Barnard.—Flowers of *Patersonia glauca*, grown at Kew.

By Mr. A. J. Campbell.—*Malurus whitei*, the Darker Turquoise Wren, a new species lately described by him ; also, for comparison, *Malurus melanotus*, Gld., the Black-backed Wren.

By Mr. A. Coles.—Four specimens of Paper Argonauts, *Argonauta nodosa*, Sol., two with side spikes. The large shell, measuring 6¾ inches by 5 inches, was taken at St. Kilda by Mr. J. W. Hazeldine, and contained the animal and cluster of eggs.

By Mr. C. French, jun.—Rare egg of the Great Bower-bird, *Chlamydodera nuchalis*, Jard. and Selb. ; egg of the Allied Oriole, *Oriolus affinis*, Gld., from Northern Territory, S.A. ; also pair of Aboriginal Kurdaitcha, or devil boots, from Central Australia.

By Mr. C. J. Gabriel.—Shells from North America, including *Natica lewisii*, *Chorus belcheri*, *Ranella californica*, and *Norrissia norrissii*.

By Mr. R. Hall.—Four specimens of the Green Sandpiper, *Helodromas ochropus*, Temm., new to Australia, in illustration of his paper.

By Mr. J. A. Kershaw, F.E.S., for the National Museum.—Mounted Specimen of *Malurus callainus*, Gld., Western Australia, and skin of the Orange-wattled Bird of Paradise, *Macgregoria pulchra*, De Vis, from British New Guinea.

By Mr. A. Mattingley.—Specimen of bird, in the flesh, preserved for 5 months by a 20 per cent. injection of formalin.

By Mr. J. Stickland.—Three Cephalopods for comparison—a Cuttle Fish, a Squid, and a Paper Nautilus, *Argonauta nodosa*, from Sandringham, with shell ; also a shell of the Pearly Nautilus, *Nautilus pompilius*, Linn.

After the usual conversazione the meeting terminated.

DREDGING IN PORT PHILLIP.

By O. A. Sayce.

(*Read before the Field Naturalists' Club of Victoria, 9th December*, 1901.)

Quite recently several members of our Club spent four days in a dredging cruise in Port Phillip, in the neighbourhood of the entrance. We were able to do this through the great kindness of Mr. E. F. Cooke, who placed his steam yacht *Firefly* and his services for navigation at our disposal. Throughout he sacrificed himself entirely on the altar of our ambition, and we tender him our hearty thanks.

Our party consisted of Messrs. J. Gabriel, J. Kershaw, F. E. Grant, and myself, and it has fallen to my lot to briefly outline some of the work done. None of us had dredged in this part of the Bay before. My remarks will be directed towards mentioning the localities we dredged at, and describing the depth and character of the bottom, and also noting some few of the animal forms met with. I am stimulated to do this, although the knowledge gained in such a limited time must necessarily be very imperfect, in the hope that it may be of some slight use to subsequent workers. We felt it to be a loss that previous workers, such as the late Mr. J. Bracebridge Wilson, who did a large amount of valuable work near the "Heads," had left so few notes of his dredging grounds behind him. He however defined and numbered certain areas (leaving large spaces unmarked), and published their bearings in the "Proceedings Royal Society of Victoria," vol. vii. (N.S.), pp. 261-263, but gave no reason for such limitations nor mention of the bottom except depth, nor life to be met with. No doubt he had sufficient reasons for forming these boundaries, but one fails to understand his system. For instance, in the middle course of the South Channel he has formed two small stations joining each other (Nos. 8 and 9), but there are wide areas higher up and lower down on each side with no stations marked at all, yet in going over the ground we could see no reason for this. We have, however, in the collecting of our material tried to follow him as closely as possible, and went armed with the Admiralty Chart with his own markings thereon.

We arrived off St. Leonards late in the evening, and anchored for the night. In the morning we shaped a north-east course, and on arriving east of Governor's Reef, and outside of Prince George Bank, started dredging, working towards the head of the West Channel. The depth varies between 6 and 8 fathoms, and for the most part with a muddy bottom of a bluish colour. Here we dredged the rare bivalve, *Nucula grayi*, and amongst other forms may be mentioned the ovoidal-shaped sea-urchin, *Echinocardium australe*, which came up in numbers in almost every dredge. Almost as common was an interesting tunicate

(Molgula, sp.) of spherical shape, and about one inch in diameter, which appeared as a ball of mud, but when this was brushed off the animal was of glassy transparency, so that the internal anatomy was to be seen quite clearly. The coat of mud took quite a lot of brushing to rub off, and must effectually serve to hide them from their prey.

Continuing onward we passed into the West Channel, marked by a pile beacon, and followed its course for a while. At first the depth of water is about 7 fathoms, but soon becomes only 4 fathoms, the bottom being sandy, with areas of weed, and is prolific of life. The forms most plentiful were the common globular sea-urchin, *Strongylocentrotus erythrogrammus*, with long-pointed spines generally of a purple, but often greenish, colour; also a very large Asteroid Star-fish, fully 15 inches in diameter, with 11 long arms, the name of which I do not know. Amongst the crabs taken we may mention *Micippa parvirostris* and *Trigonoplax unguiformis*, and of the smaller crustaceans the most important was a single male specimen of the interesting group Cumacea. Of this group Sars describes a Cyclaspis in the report of the *Challenger*, dredged from near Port Phillip Heads, but the present form belongs to quite a different family, and is congeneric with Diastylis. I know of no record of this genus occurring in Australian waters, but Mr. G. M. Thomson has described one from New Zealand, with which, however, the present form does not specifically agree. I have not yet had an opportunity to see if it can be identified with any known species.

The water being unfavourable for further work, we ran to the leeward of Swan Island, and made fast at the military torpedo station jetty. Later in the afternoon we made a fresh start, and dredged between Point Lonsdale and Queenscliff, in Wilson's stations, 2 and 3. The depth is shallow, varying from 2 to 4 fathoms, with a hard rocky bottom, difficult to dredge, also the tides run very strongly. We made a good many hauls, but were disappointed with the results, as we had expected a greater supply of life than we met with. It is, however, rich in many kinds of Algæ. The groups Hydrozoa and Polyzoa were only sparsely represented, but we got some interesting errant Chætopods, some new sessile-eyed crustaceans, and among other forms the not uncommon pedunculated tunicates, Boltenia (2 sp.), Colella (sp.), and an encrusting gelatinous form like Botrillis, but of the allied genus Leptoclinum.

After leaving this ground we went further out from shore, in the fareway of the ocean steamers, to about 10 fathoms of water. We only had time for two hauls, and these showed very good material, but the turn of the tide setting in, and night coming on, we made for Queenscliff, and anchored in the harbour for the

night. During the evening, with a flowing tide, we set a surface-net and got a considerable quantity of microscopical material which has not yet been worked, but shows a plentiful supply of Entomostraca and larval forms of crabs.

The following morning we steamed across to the opposite shore, and spent the day in working the ground lying a little off the shore, between the quarantine boundary flagstaff and Portsea, but mostly off the quarantine station. The depth varies from 7 to 15 fathoms, and is mostly of hard sand and dead shells, but in places there are nasty hard rocky patches, and our dredge was caught several times. The day's work added considerably to our collections, particularly in the smaller crustaceans and molluscs.

One notable crustacean was a single specimen of the genus Nebalia. The very small family to which this genus belongs is of great interest, as, by retaining much of the simplicity of ancestral forms, they unite certain of the Entomostraca (Phyllopoda) to the higher crustaceans (Malacostraca), and are said to be related to certain of the old-time Palæozoic fossil forms. There are but three known genera in the family, and altogether only a few species of the genus Nebalia. Prof. Sars says we only know certainly of two species, and probably a third from New Zealand. The description of this latter form, by Mr. G. M. Thomson, made several years ago from a single specimen, is not sufficient to enable me to be sure if mine agrees with it or not. Morphologically mine differs but slightly from Prof. Sars's very careful description and drawings of the old world species *N. bipes*, but I think it should be considered specifically distinct. I hope shortly through the kindness of Mr. Thomson to learn how far mine agrees with his.* Some few other crustaceans may be mentioned. Isopoda—*Astacilla*, sp., *Serolis tuberculata*; Amphipoda—*Amaryllis macrophthalmus*, very common; *Phoxocephalus bassi*, *Mœra rubromaculata*, *Liljeborgia haswelli*, several specimens of a new species of the genus Iphiplateia, and also *Icilius australis*. The two latter genera are remarkable in being much

* Since writing the above I have received specimens from Mr. G. M. Thomson of his *N. longicornis*, with which the Victorian one is identical in all respects. It differs from *N. bipes* when viewed from the side, notably by the front of the carapace descending in an almost straight line and meeting the ventral margin in a narrower curve; also by a characteristic sub-marginal dorsal spine, situated at the apex of each of the caudal rami, pointing upwards, and differing somewhat in form from those fringing the sides. On dissection, the first maxillæ have the inner masticatory lobe bearing only 10 plumose setæ and no spines, while the outer one has spines of a different form (broadening distally and pectinated, not simply bifid), and the palp is not so setose. The branchial feet are also differently proportioned, the endopodite hardly descending beyond the exopodite, its terminal joint being much more rudimentary. The last caudal legs are also more rudimentary, and not so spinulose. I hope to give a more particular description of it, with drawings, at a future time.

flattened and not compressed from side to side as nearly all the Amphipods are; the antennæ also of Iphiplateia are peculiar. We spent the night lying comfortably off Sorrento, and from the shore in the morning we collected some sand-hoppers, which I find belong to a new species of Orchestia.

The following morning we steamed up the South Channel, and commenced work near the Channel Fort, above Wilson's stations, 8 and 9, and worked downwards through them, and nearly to the mouth of Symond's Channel. The depth of water near where we commenced work reaches in places 20 fathoms, but varies considerably between that and 12 fathoms; lower down again, at about the middle of station 8, it is only 7 fathoms, and this depth is about the average for the remainder of the way. The character of the bottom, which is mostly of clear coarse sand and broken shells, combined with the depth of water, made hauling up the dredge very heavy work.

The most prominent form brought up was the interesting little Lancelet (Amphioxus), which was present in great numbers in every haul to nearly as far as Symond's Channel. As is well known they are worm-like, primitive vertebrate animals, about two inches in length, and of semi-transparent and slightly iridescent colour, structurally agreeing with fishes by the walls of the pharynx possessing many gill-slits modified for respiration, but widely differing from them and the higher animals by the want of a specially differentiated brain and other features. They swim rapidly, and are able to live for an hour or more out of the water. Sufficient water, no doubt, is contained in what is known as the atrial cavity to enable them to sustain life. They were most active on deck by frequently adopting a series of vigorous skipping movements. We had dredged them before in Western Port, but there the locality where they are found is not so extended as in this bay. Amongst them were a considerable number of an errant Chætopod worm, nearly 2 inches long, closely allied, if not identical, with the genus Ammotrypane, of a pearly colour, and resemble the Amphioxus in general appearance. I mention this, for in Western Port I found the same worm together with Amphioxus. No doubt they enjoy the same habitat, and I do not mean to suggest any causal relationship, but it has been noticed in the northern hemisphere that Ophelia, a genus very near to the above, is found with Amphioxus.

After lunch we visited the Pope's Eye Beacon, and later worked a considerable area at the entrance of Symond's Channel, in and somewhat outside of Wilson's station No. 6. The depth is between 6 and 9 fathoms, and the bottom mostly sandy and rich in general material, such as sponges, worms, echinoderms, and crustaceans. Amongst many interesting forms I may mention a particularly large specimen of a twelve-plated shield

starfish, the name of which I do not know. We had previously on this cruise dredged the not uncommon *Pentagonaster aurata*, the measurements of typical specimens of which M'Coy gives in his Prodromus as diameter from tip to tip of rays 2 inches 6 lines, and from edge to edge between rays 1 inch 6 lines. The specimen mentioned above measured respectively 4 inches 3 lines, and 3 inches 3 lines, so that the rays were relatively not so long. In other respects they agree closely. I might here mention that in Western Port I have dredged a specimen of the following measurements :—Diameter from tip to tip of rays, 4 inches 7 lines, and between the rays 2 inches 5 lines. Bringing these measurements to a similar proportion for each, and taking the diameter from tip to tip of rays as 100, then the distance from edge to edge between the rays measure—*Pentagonaster aurata*, $\frac{60}{100}$; one from Western Port, $\frac{52}{100}$; one from Port Phillip, $\frac{77}{100}$.

Amongst a large number of sessile-eyed crustaceans we may mention the following Amphipods :—*Eusiroides cæsaris*, *Syrrhœ semiserrata*, *Atyloides australis*, *Elasmopus subcarinata*, *Autonœ philacantha*; and of crabs, the Hermit, *Eupagurus lacertosus*, and also the very interesting Boring Hermit, *Cancellus typus*. This form, instead of inhabiting a univalve shell, and having one of its front legs specially developed to act as an operculum to close the mouth of the shell, is of symmetrical form, and has the two first pairs of legs differentiated to close the opening of its hole, which is bored in a stone or other foreign object. The outer face of these legs are furred, and together fit closely, and very effectually hide the opening, so much so that it is next to impossible to find them when first brought out of the water. It is only after being laid aside on deck for a while that they reveal themselves by protruding from their holes in a desire to get back to their watery element.

Amongst worms we took a few specimens of the interesting genus Syllis, having moniliform tentacles and cirri. The members of this and allied genera are remarkable for their reproduction by budding and fission. The method of one species, *S. ramosa*, I quote from Dr. Benham ("Cambridge Natural History," vol. ii., p. 282) :—"This worm consists of a main stem, whence arise a number of lateral branches, which may also branch so as to give rise to an arborescent colony. The branches of the first and second and higher orders arise by budding from the sides of the original form or branches of lower order; and some of these branches develop generative products, and bud forth a head near the point of attachment. These sexual branches no doubt separate from the colony and distribute the ova."

We also dredged a few of the Crinoid or Feather Starfish (*Antedon pumila*), some Brittle Stars, and of Polyzoa I may note the peculiar *Cryptozoon wilsoni*; this genus differs from

other Polyzoa by using sand grains to thickly surround the zooecia, so that the colony appears as a mass of thin branching and anastomosing pipes of agglutinated sand.

Heavy southerly weather came on, and toward evening we shaped a course for St. Leonard's, where we stayed the night.

In the morning we went ashore and did some collecting. The sand-hopper of the beach I found to be identical with *Talorchestia novæ-hollandiæ*, so far only recorded from New South Wales, but which I have also taken at Beaumaris, and have just lately received specimens collected by Mr. E. Ashby, from Brighton, South Australia.

The water was too rough for dredging except under shelter of a kindly shore, so we went north and rounded Indented Head and Point St. George to the westward, and dredged on Prince George Bank in about two fathoms of water, going in the direction of Portarlington. The bottom is of soft rock and sand with a good deal of weed in places, and we got a good assortment of material. Worms were very plentiful. Of the unsegmented ones, some Polyclad Planarians of normal flat leaf-like form were plentiful, and several fairly large and small Nemertines. These are easily recognized by anyone when they eject their long thread-like proboscis. Of the errant Polychæta, representatives of the genera Polynoi and Lepidesthenia were taken. The family to which these belong are peculiarly characterized by the possession of scales on their backs, so that they differ much from a general worm-like appearance. Another errant form of the genus Glycera may be mentioned, as it has not yet been recorded, so far as I know, from Australia.

Of sedentary worms we collected several species of Terebellids, and of them one specimen of the interesting genus Pectinaria, which has the head protected by large stiff chætæ of a golden colour. Its tube is prettily formed of sand grains, and the worm is short and stout (the hind portion having become degenerated), and ends in a little recurved leaf-like process.

After working this ground we called in at Portarlington, and later left for Melbourne.

The following list of Stalk-eyed Crustaceans and Mollusca collected during the cruise is supplied by Mr. F. E. Grant :—

BRACHYURA.—

Micippa parvirostris, Miers	...	West Channel
Leptomithrax spinulosus, Haswell	...	Do.
Halimus tumidus, Dana.	...	Off Queenscliff
H. truncatipes, Miers	...	Prince George Bank
Micippoides longimanus, Haswell	...	Do.
Pilumnus monilifera, Haswell	...	Do.
P. terræreginae, Haswell	...	Do.
Litocheira bispinosa, Kinahan	...	Do.

Trigonoplax unguiformis, De Haan ...	West Channel
Hymenosoma ovatus, Stimpson ...	All grounds
H. rostratum, Haswell ...	Do.

ANOMURA.—

Cryptodromia lateralis, Gray ...	Off Queenscliff
Galathea australiensis, Stimpson ...	West Channel
Munida subrugosa ...	Do.
Cancellus typus, Milne, Edwards ...	Off Queenscliff
Eupagurus lacertosus, Henderson ...	Do.
E. lacertosus, var. Nana, Henderson ...	Do.

MACRURA.—

Alphaeus socialus, Heller ...	All grounds
A. villosis, Olivier ...	Do.
Virbius australiensis, Stimpson ...	Off Queenscliff
Pandalus leptorhynchus, Stimpson ...	Do.
Leander intermedius, Stimpson ...	All grounds.

MOLLUSCA.—The only shells of special interest were :—

Conus segravei, Gatliff, the first record for Port Phillip ...	Off Quarantine Ground.
Erato denticulata, Pritchard and Gatliff, found alive ...	Do.
Nucula grayi ...	Near St. Leonard's.

DESCRIPTIONS OF SOME MALLOPHAGA FROM AUSTRALIAN BIRDS.

BY MESSRS. S. A. LE SOUEF AND H. BULLEN.

(Communicated by D. Le Souëf, C.M.Z.S.)

(*Read before the Field Naturalists' Club of Victoria, 9th December*, 1901.)

BIRDS are the hosts of numerous parasitic hemipterous insects belonging to the sub-order Mallophaga. In Europe and America these have been worked out very thoroughly, but in other countries they have received little attention, for, owing to their small size, they easily escape notice. Each family of birds has it own group of parasites, and a family with a wide distribution—as, for instance, the ducks—will have the same parasite on it in all parts of the world with but slight variations in size, the warmer countries generally affording the larger insects ; hence many European species are found on Australian birds. It is interesting to note also that the colour of the parasite seems to depend a great deal upon the colouration of the bird.

The classification of the group has been worked out by Leach,

Nitysch, and Burmeister, and is given in "Monographia Anoplurorum Britanniæ" by H. Denny (1852) as follows:—

Sub-order—MALLOPHAGA.

Family ...	Philopteridæ			Liotheidæ	
Genus ...	Trichodectes	Philopterus		Gyropus	Liotheum
		Sub-genera.			*Sub-genera.*
		Docophorus			Colpòcephalum
		Nirmus			Menopon
		Goniocotes			Nitzschia
		Goniodes			Trinoton
		Lipeurus			Eureum
		Ornithobius			Læmobothrium
					Physotomum

The genera Trichodectes and Gyropus are parasitic upon the mammalia only, and in determining the Australian forms we have followed the classification given above.

The insects to be described have been collected both from birds in their native state and from the same species in confinement at the Melbourne Zoological Gardens, and have been found to correspond in every instance, and to be constant in their characteristics.

1.—LIPEURUS GIGANTEUM, found on Australian Crane or Native Companion, *Antigone australasiana.*

Dirty white and shining head, sub-cordate clypeus truncate, lateral margins sinuated to receive eyes and antennæ, temporal angles rotundate, base concave; antennæ in female filiform, with first joint the thickest and second longest; male first joint very long, with a blunt tooth on inferior margin, second cylindrical; third short and internally produced; fourth and fifth small and filiform. Prothorax narrower than head, which it overlaps inferiorly, slightly convex anteriorly. Metathorax truncate in front, lateral margins gradually widening to basal angles, which are semi-acute, base truncate. Legs white, ungues chestnut. Abdomen semi-elliptical, with sides a little serrated; last segment in female cleft, in male produced, forming an obtuse angle. Length —Male 2¾, and female 3 lines.

2.—LIPEURUS IBIS, found on White Ibis, *Threskiornis strictipennis.*

Elongate, with a broad intermittent chestnut band round the body; head very long, somewhat conical; clypeus semi-hemispherical, with two hooked lines extending from its base downwards, and two small hairs on each side; antennæ long and filiform in female, and slightly stouter in male, with the last two joints at an angle with first three; eyes prominent, an indefinite line extending from base of antennæ to base of head, which is truncate. Prothorax quadrate, sides deep chestnut, metathorax widest posteriorly, sides chestnut. Legs long and

pale. Abdomen elongate and clavate, first two segments very long, first entirely chestnut, second with a pale line in centre, each subsequent one quadrilateral, with a chestnut patch laterally, last segment cleft entirely chestnut. Length, 2 lines.

3.—LIPEURUS MENURA, found on Lyre-bird, *Menura superba.*

Elongate, abdomen banded transversely with dark chestnut bands; head very long and narrow, margins dark brown, eyes small but prominent; antennæ long, last two joints in male stand at an angle with the rest, a dark band extending transversely between antennæ. Prothorax quadrate, lateral margins pitchy-chestnut. Metathorax truncate, sides pitchy-chestnut; legs long and pale. Abdomen elongate, nearly filiform, each segment pitchy-brown, last one cleft in both sexes; sutures pale. Length, 1¾ lines.

4.—LIPEURUS ALBUS, found on the White Sulphur-crested Cockatoo, *Cacotua galerita.*

Elongate and very pale; head sub-ovate, clypeus semi-hemispherical; antennæ in male first joint robust, second and third longer, fourth and fifth short; eyes obscure. Prothorax semi-quadrate; metathorax truncate, with lateral margins slightly converging from the base, which is width of head; legs pale and robust, ungues light chestnut. Abdomen sub-clavate. Length—Male 1 line, female 1⅛ lines.

5, 6.—NIRMUS SETOSUM, found on Emu, *Dromœus novæ-hollandiæ.*

Abdomen darkly banded in male and blotched in female. Head large and conical, chestnut anteriorly with a dark band from base of antennæ to occiput. Clypeus bifurcate, basal angles rotundate, base concave; antennæ filiform in both sexes; eyes pale but prominent, with ferruginous angular patches behind them. Legs light chestnut; prothorax narrower than head, irregularly convex in front, sides rotundate, base sinuously produced. Metathorax wider than head; lateral margins rotundate; abdomen sub-elliptical, nine segments, very setose. Female with irregular ferruginous patch on lateral margins of first seven segments, irregular chestnut patch on last segment, which is convex and cleft. Male, chestnut band across each segment except first two, which have ferruginous patches laterally. Length—Male 1⅔, female 2 lines.

7.—NIRMUS MENURA, found on Lyre-bird, *Menura superba.*

Head and thorax light yellow; abdomen with ferruginous margins; head sub-triangular, clypeus retuse, lateral margins, entire, except fovæ containing antennæ, a chestnut line runs round the head; eyes pale and obscure; tribeculæ prominent; antennæ filiform, first joint longest; legs pale. Prothorax narrow and sub-quadrate, truncate anteriorly and irregularly convex

posteriorly. Metathorax sub-ovate, with semi-acute lateral angles and semi-lunar convex base slightly wider than head; abdomen claviform, with first seven segments serrated at lateral margins, eighth and ninth segments conical, whole, and setose in the male, and cleft in the female. Length—Female 1, and male ⅞ line.

8.—Menopon psittacus, found on Rosella Parrot, *Platycercus eximius.*

Light brown, broadly banded; head sub-trapezoidal, pale fulvus, with a patch of dark fulvus at base of antennæ, and a line joining antennæ to occiput; clypeus semi-lunar base concave convex, with a dark chestnut line running transversely. Prothorax cup-shaped, slightly concave anteriorly, rotundate posteriorly. Metathorax sub-conical, wide as head, concave anteriorly, truncate posteriorly; abdomen clavate, each segment banded transversely with light chestnut. Length, 1¼ lines.

9.—Menopon menura, found on Lyre-bird, *Menura superba.*

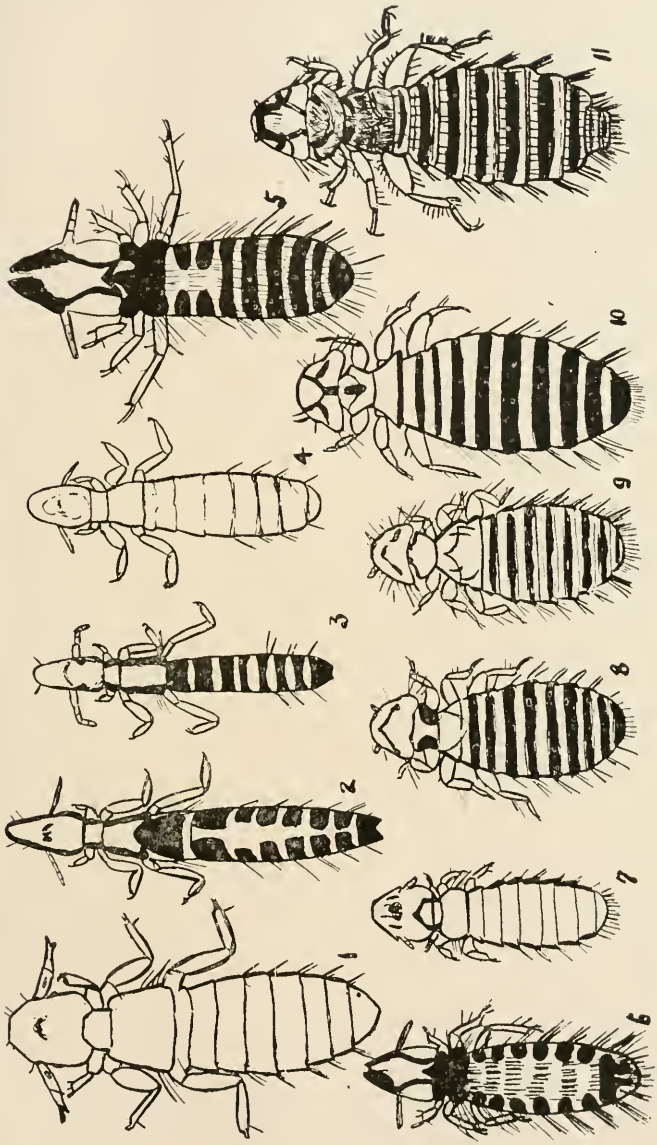
Pale yellow, head irregularly sub-triangular, a light chestnut line running behind clypeus, and extending from base of fovæ to base of occiput; clypeus conical, palpi long and filiform; antennæ capitate; eyes marked by two black spots posteriorly in fovæ, which contains antennæ; basal angles produced, base concave, with two ferruginous horny protuberances on each side of occiput. Prothorax narrower than head, truncate anteriorly, convex posteriorly, lateral angles acute and somewhat produced. Metathorax sub-conical and concave anteriorly, base width of head; legs pale yellow; abdomen sub-clavate, bluntly serrated at lateral margins; sutural margins slightly setose. Length, 1⅛ lines.

10.—Colpocephalum vinculum, found on Pied Crow-Shrike, "Apostle-bird," *Strepera grauculina.*

Deep chestnut, abdomen very distinctly banded; head transverse, a chestnut line extending from base of palpi to eyes, where it gets pitchy-black, a small black spot immediately behind this; basal angles produced to dark chestnut, with three light hair follicles. Prothorax sub-quadrate; lateral angles acute, a dark line running transversely anteriorly, and a sinuated line running from middle of anterior side to centre. Metathorax transverse, sub-conical, basal angles acute and prominent; legs robust, lined with deep chestnut; abdomen semi-elliptical, each segment broadly banded with deep chestnut, and having a small black longitudinal line on lateral margins. Length, 2 lines.

EXPLANATION OF PLATE.

1.—Lipeurus giganteum.
2.—L. ibis.
3.—L. menura.
4.—L albus.
5.—Nirmus setosum (male).
6.—N. setosum (female).
7.—N. menura.
8.—Menopon psittacus.
9.—M. menura.
10.—Colpocephalum vinculum.
11.—Heterodoxus macropus.



S. A. LE SOUEF, *Del.*

NEW SPECIES OF MALLOPHAGA.

Process Block, TRIUMPH ENG. CO.

DESCRIPTION OF A MALLOPHAGOUS PARASITE FROM THE KANGAROO.

By S. A. Le Souef and H. Bullen.
(Communicated by D. Le Souëf, C.M.Z.S.)

(*Read before the Field Naturalists' Club of Victoria, 13th January*, 1902.)

This insect (fig. 11 on plate) is interesting on account of its being only the second two-clawed parasite of the family Liotheidæ which has been found on a mammal.

For the previously recorded two-clawed parasite found on the Wombat, the genus Boopia was founded by Piaget. The insect under consideration differs, however, in many respects from it, and closely resembles the sub-genus Menopon, but as that sub-genus has been regarded by former writers as being exclusively confined to birds, in order that there may be no confusion we have determined to found a new genus, Heterodoxus, for it.

The specimens examined were found on members of the Kangaroo family, chiefly Wallabies, which were generally thickly infested, and were collected in Victoria, as well as in Queensland. We have not met with it in Western Australia, but it probably exists there also.

Heterodoxus macropus.—Found on Kangaroos, Wallabies, &c.; colour pale chestnut; head bluntly conical; clypeus semi-lunar, basal angles rotundate, base concave; palpi filiform, four-jointed, and sometimes exserted; antennæ four-jointed, first joint cylindrical, second semi-globular, third goblet-shaped, and fourth capitate; eyes rather obscure, a dark line extending from base of palpi transversely and then to occiput. Prothorax transversely ovate, anteriorly truncate, posteriorly convex. Metathorax semi-conical, anteriorly narrow and concave; posteriorly slightly convex, with semi-acute lateral angles. Legs pale, long, and robust, second joint of tarsi long and straight, two divergent ungues; abdomen elongate ovate, nine segments with lateral margins bluntly serrated; last segment of male convex, of female truncate. Length—Male 1¼ lines, female 1½ lines.

The Walhalla Goldfield.—A comprehensive report on the Walhalla goldfield, by Mr. H. Herman, B.C.E., F.G.S., Acting Government Geologist, illustrated with plates, plans, and sections, has recently been issued by the Department of Mines, Victoria (price 5s.) A full account is given of the geology of the district, which is principally Upper Silurian, and of the numerous mines which have been opened up; while Mr. A. W. Howitt, F.G.S., furnishes a report on the microscopic examination of a large series of rock sections, and also contributes some interesting notes on the Eucalypts of the district. A list, with notes, of the more noticeable plants found in the neighbourhood of Walhalla is contributed by Mr. H. T. Tisdall, who enumerates over 400 species, many of which are somewhat rare.

Central Australian Anthropology. — The expedition under the leadership of Professor Baldwin Spencer and Mr. F. J. Gillen duly reached the Macarthur River, Northern Territory, as forecasted in the November *Naturalist*; but Prof. Spencer, writing on 10th December from Borroloola (16° S., 136½° E.), a small township about 50 miles from the mouth of the river, states that the expedition has been delayed there, owing to the foundering of the steamer which should have taken them on to Port Darwin as previously arranged, and as the next steamer is not due until some time in February, a long, tedious wait must result unless some steps are taken to send a vessel earlier. The members of the party have all had a touch of malarial fever, and are consequently not in a fit state to stand the approaching wet season in the Northern Territory, and as, in anticipation of the steamer being at Borroloola, they had disposed of their transport equipment before reaching there, they are unable to make the land journey to Port Darwin, some 650 miles, while Normanton, the nearest town of importance in Queensland, is some 350 miles away, over a difficult route. Either journey would be a rather arduous undertaking in the present circumstances. The matter of affording the expedition some relief was brought before the Commonwealth Parliament without result. However, the Premier of Victoria (Hon. A. J. Peacock) placed himself in communication with the Queensland Government, and it has arranged to send a small steamer from Normanton, and bring the party on to that port, from whence there is frequent communication with Eastern Australia. Prof. Spencer should therefore reach Melbourne towards the end of February.

The Geology of Lake Eyre, Central Australia.— Professor Gregory, F.R.S., and a party of his students from the Melbourne University may be congratulated on the successful termination of one of the longest vacation excursions yet made in Australia. The object of the trip was to study the geology of the Lake Eyre basin and make a collection of the fossil remains of extinct animals, &c., which are to be found there. Making Hergott Springs, about 490 miles north of Adelaide and just 777 miles by railway from Melbourne, their starting point, they travelled north-easterly to Cooper's Creek, thence northerly to the Diamantina River, and then round the northern shores of Lake Eyre, striking the railway again, after a journey of about 350 miles through almost uninhabited country, at Warrina, nearly 200 miles north of Hergott Springs. Owing to the dry nature of the country camels had to be employed as means of transport, and notwithstanding the difficulties of the trip a good collection of palæontological as well as zoological and botanical specimens was made, and will form work for future study.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary monthly meeting of the Club was held in the Royal Society's Hall on Monday evening, 10th February, 1902. Mr. O. A. Sayce (one of the vice-presidents) occupied the chair, and about 70 members and visitors were present.

REPORTS.

A report of the Club's excursion to Bulleen on Saturday, 18th January, was read by the leader, Mr. W. Stickland, the object of the excursion being pond life. Some pools on the south bank of the Yarra, between Willsmere and Heidelberg, were visited, and a number of interesting Rotifers were secured, belonging to the genera Lacinularia, Floscularia, Melicerta, and Œcistes; also *Synchæta tremula*, *Furcularia longiseta*, *Dinocharis tetractis*, and others. Among the Protozoa taken were *Actinospærium eichhornii* and *Carchesium polypinum*. *Stentor barretti*, believed to be an unrecorded species for Victoria, was also taken; as were also specimens of Volvox, Algæ, &c. Almost the only plant seen in bloom was *Convolvulus sepium*.

A report of the excursion to Upper Ferntree Gully on Monday, 27th January (Foundation Day), was furnished by Mr. C. French, jun., who acted as leader on the occasion. Among the plants noticed were mentioned *Veronica calycina*, *Senecio lautus* (with very small leaves), *Lobelia simplicicaulis*, *Glycine latrobeana*, and a very fine specimen of the orchid *Dipodium punctatum*. Lepidoptera were reported scarce, while among the Coleoptera specimens of *Chlorobapta bestii*, *Stigmodera bremei*, *Mordella leucosticta*, &c., were collected.

LIBRARIAN'S REPORT.

The hon. librarian reported the receipt of the following donations to the library:—"Report on the Underground Survey of Mines at Bendigo," from the Department of Mines, Victoria; *Journal of Agriculture of Victoria*, No. 1, January, 1902, from the Department of Agriculture, Victoria; "Report of Government Entomologist of Victoria," 1900, by C. French, F.L.S., from the author; *The Wombat*, January, 1902, from the Geelong Field Naturalists' Club; "Proceedings of the Royal Society of South Australia," vol. xxv., part 2, 1901, from the Society; publications of the Field Columbian Museum, Chicago, for March, April, and June, 1901, from the Museum; "Proceedings of Academy of

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Natural Sciences, Philadelphia," vol. liii., 1901, from the Academy; *Nature Notes*, January, 1902, from the Selborne Society, London; *Science Gossip* and *Knowledge*, January, 1902, from the proprietors; *American Microscopical Journal*, January to July, 1901, from the publishers.

ELECTIONS.

On a ballot being taken, Mr. W. H. Luly, Preston, was duly elected a member of the Club.

GENERAL BUSINESS.

Mr. F. G. A. Barnard drew attention to the fact that the Government proposed to cut up the land formerly held by the Zoological and Acclimatisation Society as a reserve at Gembrook, and thought that the Club should urge that portion of the land be reserved along the Gembrook Creek for the protection of the vegetation. He therefore moved—"That a letter be written to the Minister of Lands asking that a strip of land, at least 5 chains in width, on each side of the creek, be reserved." Mr. H. T. Tisdall seconded the motion, which was carried unanimously.

PAPERS.

1. By Mr. D. Le Souëf, C.M.Z.S., "A Visit to Furneaux Group of Islands."

The author gave an interesting account of a recent visit to these islands, which was undertaken principally with a view to the study of the bird life so abundant on them. Among the birds seen was mentioned the Cape Barren Goose, which the author thought ought to be protected, stating that the settlers tried to keep down their numbers on account of their eating the grass required for the few bullocks which are kept on the islands. Greater interest was lent to the paper owing to the exhibition of a fine series of lantern views of scenes on the different islands visited.

Messrs. G. A. Keartland and A. E. Kitson supported Mr. Le Souëf's remarks regarding the Cape Barren Goose, and thought that some steps should be taken to preserve this interesting bird.

Messrs. R. Hall and A. J. Campbell also took part in an interesting discussion which followed.

2. By Mr. G. A. Keartland, entitled "Among the Birds of Riverina."

The author detailed the ornithological results of a visit to Riverina in September last, in company with two other members of the Club, and exhibited a number of specimens collected in illustration of his remarks. A large number of birds were noticed during the trip, many of which were found nesting.

In the discussion which followed Messrs. R. Hall, D. Le Souëf, and A. J. Campbell took part.

EXHIBITS.

By Mr. E. Anderson.—Specimens of the moth *Bombyx trimaculata*, bred from larvæ collected near Melbourne.

By Miss S. W. L. Cochrane.—Painting of *Tetratheca ciliata*.

By Mrs. C. French, jun.—13 Argonaut shells, *Argonauta nodosa*, varying in size from 1 inch to 6 inches in diameter.

By Mr. C. French, jun.—Fungus, *Microcera tasmaniæ*, M'Alpine, destroying the Mussel Scale, *Mytilaspis pomorum*.

By Mr. G. A. Keartland.—Birds and eggs from Riverina, in illustration of paper.

By Mr. A. E. Kitson, F.G.S.—Glaciated pebbles from the recently discovered glacial beds of permo-carboniferous age on the N.W. coast of Tasmania, at Wynyard, Table Cape. Samples of rocks forming glacial conglomerate, Wynyard. Impure limestones of Eocene (?) age, showing fossil molluscs and leaves on same specimen, from Mitchell's Creek, near Wynyard. Tasmanite, with marine fossils, consisting of Lamellibranchs, Gasteropods, and Brachiopods, from the permo-carboniferous beds on the Mersey River, near Latrobe, Tasmania.

After the usual conversazione the meeting terminated.

NOTE ON THE GREEN SANDPIPER, *HELODROMAS OCHROPUS*, TEMM.

By Robert Hall.

(*Read before the Field Naturalists' Club of Victoria*, 13*th Jan.*, 1902.)

Hitherto this genus, closely allied to Totanus, has not been recorded as found in Australia. The specimens on the table were forwarded to me from the estuary of the Fitzroy River, North-West Australia, by my correspondent, Mr. J. P. Rogers. I had intended to give the title of this paper as "A New Species of Helodromas," but upon consideration of analogies I would rather treat my four specimens as forming an undescribed phase of *H. ochropus*, and record their divergence from the description in the "British Museum Catalogue of Birds," vol. xxiv., p. 437 (R. B. Sharpe).

What is plainly seen in these four specimens and those recorded by Dr. Sharpe are the following points:—

1. The culmen varies between 1.1 and 1.5 inches.
2. The tarsus varies in length between 1.2 and 1.55 inches.
3. That the rump is not always white, in contrast to the back, as the Fitzroy River specimens show a uniform brown rump (adult), and one whose feathers are slightly tipped with white.

The key to the species given on p. 437 of the Catalogue quoted does not seem to me to be in agreement with the same region

in the adult male type described. It appears to me the rump (which makes the key to the species) may be :—

(*a*) Brown, as on the back.

(*b*) Brown, slightly tipped with white.

(*c*) White, in contrast to the back, though this appears more a question of upper tail coverts than rump.

The tail quills in my Australian specimens also vary from others. The centre feathers are each marked by some 10 wide cross-bars of brown with narrow alternating white bars.

The measurements of the skins received are :—

	Total length of skin.	Wing.	Culmen.	Tarsus.	Tail.
	ins.	ins.	ins.	ins.	ins.
A. Adult male, 19/1/01 ...	9.3	5	1.1	1.5	2.35
B. Imm. male, 11/10/01 ...	8.2	4.6	1.1	1.45	2.35
C. Adult female, 18/10/01	8.5	4.9	1.1	1.55	2.4
D. Imm. female, 18/10/01	8.25	4.75	1.1	1.5	2.3

The plumage in general of A is darker than that of B. The head of A is uniform brown ; that of B, brown mottled with white. The relation of D to C is very much as B is to A, excepting that the white markings of D are the most distinct of all the specimens, being clearer and larger. The markings referred to are upon the secondaries and scapularies. Eventually it may prove to be a species confined to the East, and making its annual migratory journey from Eastern Siberia to Australia.

AMONG THE BIRDS OF WESTERN AUSTRALIA.

By Robert Hall.

(*Read before the Field Naturalists' Club of Victoria*, 13*th Jan.*, 1902.)

I left Melbourne about the middle of September, 1899, for Albany, and returned exactly two months later. Of this time six weeks were available in our sister State for about 2,000 miles of train travelling, a 9-days' cruise among the coral islands adjacent to Geraldton, two visits into the heart of the magnificent Karri country, and short journeys into various localities. The flora was richly and beautifully displayed, with fields of flowers everywhere—one stretch of 600 miles particularly being a gigantic flower garden, gay with blooms of different genera, as the soils varied during the run from south to north. At this period of the year one sees wonderful sights, both faunal and floral, but in this paper it is my intention to lightly speak of the birds only, and give you some idea of what may be seen in a rapid tour.

There is a melancholy quietness about the inner south-west corner of Western Australia, just as there is among the deeper

valleys and hillsides of our Gippsland forests, and birds, like other creatures, prefer the sunshine, its cheer, and the better food of more open country. Honey-eaters fringe the heavy timber, and Red-tailed, *Calyptorhynchus stellatus*, Wagl., and White-tailed Cockatoos, *Calyptorhynchus baudini*, Vigors., go further in to screech and hunt large grubs such as the Aboriginals call "bardees." Fifty miles due west of Albany there is a peculiar collection of one-shaped houses. This is Denmark, a saw-milling township of some 2,000 people. They rent houses as much alike as, a writer has pleasantly said, a group of our "Tommy Atkins." Near its saw-dust fire, which has burned day and night for years, the Boobook Owl came one night and called, and it is not unlikely other owls were about the place, as there are a fair number of rodents to supply them with food.

The surroundings of Denmark are deeply interesting for the general naturalist as well as for the "bird-man." Through it, and between well-worn sides, the River Denmark has made its way to a large lake three miles down-stream that connects with the sea when the bar is not silted up. Upon this expanse of water, with a coast-line of nearly 120 miles, owing to its indents and innumerable bays, the water birds revel. Pelicans are said to breed there, but the peace of the latter is now much disturbed, and I expect that their old breeding haunts will soon cease to exist. I watched one native bird in captivity cleansing its plumage. It used the tip of its bill for cleaning the distal feathers, or the edges of the different parts of the mandibles were useful according as how near the feathers were, so that the tip of the bill could not be used. The sides of the head, first one and then the other, were used to brush the wing coverts, upper first, followed by attention to the lower. The bird rushed its huge bill along the back feathers as if it was a rapier, and extended its neck into a grotesque figure when it wanted to preen the lower neck plumes.

Sea Eagles, *Haliaëtus leucogaster*, Gmelin, came from their ocean feeding grounds daily to a nest about two miles inland. It was situated some 150 feet from the ground, in a large eucalypt, and to timid people seemed only to be got at by the wind. It was a wonderful pile of faggots. On the Abrolhos Islands I found I could get two nests without the necessity of trying my nerves. One I stepped into from the ground and turned the fledged young one out for a time, so that I might sit in it to try its comfort. To the other I simply had to walk up a few rocks that once formed part of a cliff. Judging by the manner which a pair continued to sail round the nest, and the new material of the upper portion of it, I should say they were about to lay their eggs, as the time of laying varies very much. The nest was not more than 15 feet above high-water mark, and placed between

old masses of rock left when all softer material had been washed away. The nest was made of salt-bush limbs, and only two or three roots of rank grass were upon the surface as if for the variety they provided. The diameters of the structure were 8.3 feet x 5.5 feet, and the depression was very slight. Near one end of the mass, upon the floor of which were numerous small twigs, I stood and observed very little elasticity. The depth of the whole was between 2 and 3 feet. The eagles seemed much disturbed at my interference.

Parrots and cockatoos were numerous. The "Toonat," or Twenty-eight, *Platycercus semitorquatus*, Quoy and Gaim., would daily feed among the horses in their open stables. Just above Geraldton this, or a closely allied, species does not enjoy the water supply available to the southern bird. As a consequence it watches an opportunity to climb down the bucket rope of a well (20 to 30 feet deep) to secure a drink. It then has been observed to climb up and fly away. One case of drowning was reported to the writer. The Yellow-cheeked Parrakeet, *Platycercus icterotis*, Temm., which is the Western Rosella, would accompany the "Twenty-eight" in its visits, and I secured birds in different stages of plumage, excepting that of the nestling. It is not so heavy a bird as the Rosella we know so well; however, its rich colour and yellow cheeks, instead of white, are full compensation. I was too early to find them breeding on 25th September, and was only able to find nests on 4th November which could not be reached in the towering gums without the means of a strong nerve, a gun, a string, and a rope. I was greatly pleased in securing a specimen of the Red-capped Parrakeet belonging to only genus of Psittaci peculiar to Western Australia. In it there is but one species and the generic name, Porphyrocephalus, applies specifically to the fine little Lory, Glossopsittacus, that annually visits Victoria. There was only one pair about the locality. It was breeding, I think, but one of the pair seemed quite immature.

Baudin's, or the White-tailed Black Cockatoo, had a nest next to a potato field in a quiet part of the country near Denmark, but it was high up in a dead gum, and remained there. The birds used to come and go and not mind the regular faces near its nest.

In a valley near by I found a nest of the White-breasted Robin, *Eopsaltria gularis*, Quoy and Gaim., containing two fresh eggs (29/9/99). The nest was similar to *Eopsaltria australis*, but not so beautiful or strong. It had a partial external covering of dry bracken. Depth outside, 2.5 inches; depth inside, 1.5 inches; whole diameter, 3 inches; inside diameter, 2.25 inches. It was placed four feet from the ground in a scrubby acacia.

It is pleasing to one to note how certain little birds pick out a water-sodden valley in a wide stretch of country, and there

build their nests and enliven the scene. This was just such a one. For five days I hunted through a good deal of hilly country, and this one spot was the only charming one I met—that is to say, the only delightful one to the ornithologist. I could have enjoyed many plant studies, but a rapid traveller must concentrate his efforts. I saw above me a nest of the monarch-like bird, the White-bellied Sea Eagle, and beneath it scores of Honey-eaters, Thickheads, Robins, and Western Finches. It was an "oasis," and I looked for more without success.

Three miles east of Denmark (the property of Messrs. Millar Bros.), on the "black-boy" (Xanthorrhœa) fringe of the town, a pair of Emus was seen. Why they should show a preference for this sodden class of country I cannot say, but such they did, because for months past they had been seen near the private railway line. They were at least thirty miles inland from the border of the rainy block. With the winter they would need to be wading birds in the sodden land and saturated undergrowth. Emus can swim rivers if necessary, so there would be no impediment on that account. A curious incident in the domesticated habits of this bird occurred under the notice of Mr. Price Fletcher, who described it to me in the following terms:—"A little three-year-old child was trailing a small tin horse and cart, when along came an Emu and swallowed all but half the string. The remaining half dangled from its beak for half the day until cut sufficiently short to allow it to swallow what had been an irritation for hours. Both child and Emu were considerably astonished. Tame Emus are by no means desirable pets, for strange horses when tied to fences will get terribly frightened by the prying bird, and eventually do damage to property. Emus are said to be a nuisance among the flocks, as young lambs will follow any large quickly moving object and thus get led away by Emus in broad areas. By this means lambs soon lose their "dames" and themselves. In addition the Emu seems to take a delight in chasing both lambs and mothers."

On cattle runs and agricultural blocks this bird is a friend, being insectivorous and graminivorous, though particularly useful as a destroyer of insect pests. The Hon. James Balfour had a tame bird that could be mesmerised quickly, and falling upon the ground might be easily fed. After a few months it got to know that it had a weakness, and with any attempt to mesmerise away it would run as a safeguard (1898). Mr. John Allis tells me the food of the birds near Murchison consists greatly of "quondongs" (Santalum) in the season. The young, when captured, lie down, and sometimes die at once. When observed the female may run towards you or wait your approach; the male stands off calling "bump, bump, bump" with a very guttural expression. A quiet dog does not annoy an Emu, but

a yelping one will excite the bird so much that it may run accidentally into a bush. If one does not capture an Emu in its first half-mile, and before it gets the "second wind," the opportunity is lost, unless the horse is really good. To get a "second wind" it stays about a minute. Eventually the neck begins to droop with fag if hard pressed.

Although bird life between Albany and Denmark is interesting and tolerably plentiful, much time is needed to observe their nesting habits. The timber is too vast and the undergrowth too thick to find any nests without patiently spending much time to do so.

On a small island at the entrance to the Denmark River (Lake Wilson), the Wedge-tailed Petrels, *Puffinis chlororhynchus*, Less. (?), had prepared their hollows for November laying. Thousands of eggs would then be laid, and some half-dozen people who knew of the matter would go and gather a fair quantity for home consumption. This spot is about 30 miles from Denmark and about 20 from Albany, and the "half-dozen" people nearly include the whole population. Many water birds resort to the district, but I was particularly surprised at the want of waders in reed beds and good lagoons that seemed inviting. Evidently there is too much water and not enough food.

(To be continued.)

AMONGST THE BIRDS IN RIVERINA.

By G. A. Keartland.

(*Read before the Field Naturalists' Club of Victoria*, 10*th Feb.*, 1902.)

Towards the end of September, 1901, three members of this Club (Messrs. C. C. and T. A. Brittlebank and myself) decided to avail ourselves of the kind invitation of some friends in Eastern Riverina to visit that district, with the object of studying the habits of some of the avifauna found there, and, if possible, adding to our collections.

Although some of the birds under notice are not only well known but were at one time common near Melbourne very little has been written concerning them, and in one case part of that little is erroneous. I allude especially to Barraband's Parrakeet, *Polytelis barrabandi*. We therefore took the morning train for Wagga, N.S.W., with the hope of seeing something interesting as we passed along, and were not disappointed. A fellow-passenger gave us the history of the Kelly Gang and of numerous other bushrangers, pointing out several hills to which they retreated when evading the police, and from whence they made raids on their victims. Passing Glenrowan township, the place where three of these desperadoes met their doom was seen. Then the

Henty bank, which was the scene of one of the most recent attempts at robbery under arms, was indicated, and the places where the would-be robbers camped, burnt their clothes, and hid their weapons, within view from the train, all tended to prove the very crude plans of the perpetrators. However, the train was now approaching more interesting country to us as naturalists, and many nests of the Pomatostomus were noticed in the trees beside the railway line. Rabbits, hares, and a fox scampered through the timber, and many well-known birds were disturbed in passing. We gradually passed from the haunts of the White-backed Crow-Shrike, *Gymnorhina leuconota*, to that of the Black-backed species, *G. tibicen*, and at one point of the route noticed the two species in the same paddock. Nearing the Murray River flocks of Cockatoo Parrots rose from the ground, but Albury was passed before the "Green-Leek," or Barraband's Parrakeet, was seen. The first flock, consisting of five males and one female, were perched on a fence.

On arrival at Wagga we found Mr. Bert Williams waiting for us with a large waggonette, but our party and luggage taxed its carrying capacity to the utmost. In due course we reached the home of our future pilot's mother (Mrs. Williams), who, with her family, gave us a very hearty welcome, and each of her sons vied with the others in assisting us in various ways. After tea we completed arrangements for a 20-mile prospecting trip next day, and paid several visits to residents who possessed objects of interest to us. One gentleman exhibited some eggs, which were broken, in spirits, revealing young birds almost hatched. The owner regarded them as the product of the Australian Snipe, *Gallinago australis*, but they looked more like young rails, with the difference that they were striped instead of black. Whatever they are, the gentleman declares the snipe, which he shot, rose from the nest near his feet. However, we intend to investigate the matter further.

Next morning horses were harnessed, and a start made for localities in which our friends anticipated finding several species of parrots breeding. Along the road flocks of from 20 to 30 Red-rumped Parrakeets were disturbed, but as they were all males we concluded that their mates were busy with family matters. When females were noticed they were in company with their consorts, examining hollow spouts with a view to nesting. We frequently passed pairs of the Grey Struthidea, *S. cinerea*, stalking sedately by the roadside, almost within reach of the whip. Why the term "Grey Jumper" should be tacked on to these birds is a mystery, as those seen on the ground were the most staid birds I ever saw, and those amongst the box timber and pine scrubs displayed but little activity, certainly nothing like that of the Pomatostomus in the same neighbourhood. Their pretty mud nests in the pines were occupied by young birds or eggs in an

advanced stage of incubation. Many pairs of the Little Lorikeet, *Glossopsittacus pusillus*, were noted passing in and out of holes in the dead timber, and several clutches of eggs secured, and also one pair of young ones well feathered, and which are now thriving as cage pets. The Yellow-rumped Parrakeet, *Platycercus flaveolus*, was found in the open box forests, either feeding on the blossom or seeking thistle-seed on the ground. They were also nesting in the hollow spouts. It will be interesting to know that the depraved taste which occasionally causes these birds to eat their feathers when in captivity is sometimes shared by those in a state of nature, as one bird shot had been indulging in the practice to a considerable extent. They are known to the local residents as the "Blam Blam," a name probably derived from the aborigines.

The especial object of our visit, Barraband's Parrakeet, was not found until many miles had been traversed. At first solitary males, in all the splendour of perfect plumage, were observed, and several shot, but afterwards a flock of five or six were noted extracting the honey from the blossom of the yellow box, and more specimens were secured. These birds appeared to be living almost entirely upon honey, which simply poured from the mouths of those killed, and only a small amount of chickweed seed was found in their gullets. In describing these birds in his book on "Nests and Eggs of Australian Birds," Mr. A. J. Campbell has fallen into a slight error in stating that "the female is little inferior in colour to the male." Gould had already pointed out the marked difference, and the specimens on the table confirm his statement. With regard to their eggs, instead of from 4 to 5 eggs being the clutch, of 14 nests of which I have complete data each contained 6 eggs. One female bird shot had its back liberally spangled with yellow, but this was an abnormal one. All the females disturbed from the nests were lacking the yellow and red on the face and throat, whilst every male was adorned with those brilliant colours. It was in quest of the eggs of this Parrakeet that one of our comrades (Mr. F. Williams) displayed his skill and intrepidity in climbing, our only regret being that we could not obtain a photo. of him as he dangled in the loop of a rope some 70 or 80 feet from the ground, coolly smoking his pipe and chopping for about 40 minutes at the side of a huge limb to get at the nest, only to find that the eggs were beyond his reach. However, perseverance was ultimately rewarded. Those collectors who succeed in taking the eggs of the "Green-Leek" are deserving of all credit for their courage.

Near the river many nests of the Sulphur-crested Cockatoo, *Cacatua galerita*, were discovered through the birds screaming as they flew from the holes. On examining a hollow from which a Great Brown Kingfisher, *Dacelo gigas*, was disturbed, we found a phenomenal clutch of 5 partly-incubated eggs. As I imagine this to be a record clutch I have reserved them for my cabinet. Here

we also found the Blue-faced Honey-eater, *Entomyza cyanotis*, but all the nests contained young ones. The Friar-bird, *Philemon corniculatus*, livened our camp with its loud notes, whilst the Sordid Friar-bird, *P. sordidus*, kept up a constant battle with the Warty-faced Honey-eaters, *Meliphaga phrygia*, which visited the trees laden with blossom. Peaceful Doves came to drink or give forth their melancholy notes by the river side. High up in a giant eucalypt a White-headed Osprey, *Pandion leucocephalus*, had built its nest at the unusual height of about 80 feet from the ground.

Whilst one of our party stayed in camp skinning the birds shot, the others drove to a swamp some miles further on, in quest of waterfowl. Several species of duck were noted, such as Black Duck, White-eyed Duck, and Teal. Two very fine Pelicans were shot, and the male, which was unusually large, was forwarded, with other birds, to the National Museum, Melbourne. His measurements were 8 ft. 4 in. across the wings and 6 ft. 4 in. from point of bill to end of tail. Several Crimson-bellied Parrakeets were seen in the scrub, and some shot. The common Rosella, *Platycercus eximius*, has lately become very numerous in the district, where a few years ago it was regarded as a novelty. As night was approaching, a short cut was made for the camp, but, alas, a wire fence blocked the way. To go round to the gate passed through on the outward journey meant a long drive in the dark, so our friends lifted the buggy over the fence, and then, by spreading coats and bags on the top wire, the pony was persuaded to jump over. Thus camp was reached in time for tea, and to find that a couple of nice large fish were secure on the lines left in the river.

On visiting another spot next day we found many Choughs, *Corcorax melanorhamphus*, and saw one young bird which had just left the nest. Some beautiful Bee-eaters, *Merops ornatus*, were shot, and a specimen of the Striated Pardalote, *P. striatus*, caught in its burrow on the river bank. After examination it was liberated, but its four pearly-white eggs taken. In the open forest a pair of Southern Stone Plover, *Burhinus grallarius*, were disturbed, and on passing the spot from which they rose a pair of newly hatched young ones were picked up. They were brought into camp and fed for a couple of days, being allowed to roam about whilst any of the party were near. It was interesting to see the little fellows march straight to the river edge, and run into the shallow water, where they waded for a considerable time. Although so young they picked up insects and caught flies, which were numerous on the scraps lying about. They appeared to feel the cold at night and on the morning of my return to Melbourne died in the box, much to my regret, as I was anxious to observe their growth and to ascertain how long they took to attain adult stage.

Whistling Eagles, Brown Hawks, and Nankeen Kestrels passed over the camp. The White-throated Gerygone, *G. albigularis*, hopped about the logs and fences with the Brown Tree-creepers, *Climacteris scandens*, and the Red-capped Robins, *Petrœca goodenovii*, were seen in the scrub, but the Maluri were conspicuous by their absence. On picking up a local newspaper to pack some of our specimens, I discovered an advertisement notifying that any persons trespassing on the estate on which our camp had been pitched would be prosecuted, but my alarm was allayed by our pilot, who had thoughtfully obtained an exemption in our favour. On the return journey we called and partook of tea with the owner, who has kindly given us another invitation for next year. Since our return some nice young parrots of several species have been sent us, which will enable further information to be obtained concerning the stages of moulting.

THE BUTCHER-BIRD, *Cracticus destructor*, Temm. — Though familiar with the Butcher-bird, locally known as the "Derwent Jackass," I was not aware until early in October last that it sometimes follows the same practice as some magpies in flying savagely at any passer-by. While going through some scrub near Kongwak township I was attacked by this bird, which snapped its beak viciously in passing, emitting at the same time loud notes of remonstrance. It made repeated darts and snaps at me until I was out of the scrub, and instead of perching well out of reach, as the magpie usually does on such occasions, it lit on low twigs only a few feet away from me. Again, in contrast with the magpie, which usually gives no warning of its intended dart, this Butcher-bird was all the time very noisy and excited. On that occasion I had not time to look for the nest, but later on, after some searching, aided by the greater vehemence and celerity of the attacks, I found it and three young ones almost fully fledged. The nest was a poorly-built one, in an exposed position, against the trunk of a sapling, and part of it had apparently been blown down. Two of the young birds were in it when found, while the third was on a twig near the ground. The parent birds—female as well as male, and not the latter only, as is the case with magpies—were very savage, while I was looking at and handling the young ones, and continually struck my hat sharply with their beaks in passing backwards and forwards close behind each other. I brought away what appeared to be a male bird, and kept it for some days, feeding it on beetles, cockroaches, spiders, grubs, worms, lizards, and raw fresh meat, and the quantity of food of this kind it ate was surprising. It is now in possession of a fellow-naturalist in Melbourne. I might also mention that most of the magpies in this locality, both near and a long distance from the township, seem to belong to the pugnacious class. —A. E. KITSON, Geological Survey Camp, Kongwak.

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FIELD NATURALISTS' CLUB OF VICTORIA.

The ordinary meeting of the Club was held in the Royal Society's Hall on Monday evening, 10th March, 1902. The president, Mr. T. S. Hall, M.A., occupied the chair, and about 50 members and visitors were present.

REPORTS.

A report of the Club's dredging trip in Port Phillip Bay on Saturday, 15th February, was given by the leader, Mr. J. Gabriel, who stated that about thirteen members attended. The water was, however, rather too rough to get the best results with the dredges, but a fair amount of material was secured, and taken home for more careful examination. Nothing of any rarity, however, had been reported from the results of the afternoon's work.

GENERAL BUSINESS.

The chairman announced that it had been decided to reprint the Club rules, and as several alterations had been made since last printed, the committee had given the whole of the rules careful revision, and slips as now proposed were distributed among those present.

Mr. G. Coghill gave notice, on behalf of the committee, that a special meeting of the Club be held on the night of the next ordinary meeting, and that he would then move that the rules as now printed be adopted as the rules of the Club.

Mr. G. A. Keartland considered that it would be advisable that the resolution adopted by the committee some time ago, viz., "That all papers sent to the Club must be submitted to the committee for their approval before publication," should be either be rescinded or made one of the rules of the Club.

Mr. F. G. A. Barnard said he thought that if any alterations were desired in the rules as now printed notice must be given of such alteration at the present meeting.

Mr. J. F. Haase then gave notice of motion that he would move—"That the resolution be adopted as a rule of the Club."

PAPERS.

1. By Mr. F. L. Billinghurst, entitled "Some Notes on the Dragon-flies of the Alexandra District, Victoria."

This paper consisted of a number of interesting field notes on the Dragon-flies collected by the author at various times in the Alexandra district, and which had been submitted by him to M.

René Martin, a French entomologist, for determination. A list of the species was given, together with brief descriptions of the habits and natural colours of many of the species, which will be found very useful to future workers in this group.

The president and Messrs. F. G. A. Barnard, A. D. Hardy, and J. A. Kershaw discussed the paper.

2. By Mr. J. A. Kershaw, F.E.S., entitled "Notes on the Paper Argonauts."

The author gave a rather lengthy account of the two species of Argonauts which occur in Victorian waters, dealing more particularly, however, with *Argonauta nodosa*, the species which has recently appeared in large numbers in Port Phillip Bay. A detailed account of their habits, distribution, &c., was given, together with their principal distinguishing characters, and some debatable points were mentioned, with a view to encouraging further research. A brief description of the structure and distribution of the Pearly Nautilus was also given.

In the discussion which followed Mr. E. T. Stevens mentioned an instance in which an animal, while confined in a small vessel of water, deserted her shell and re-entered it again.

The president and Messrs. F. G. A. Barnard, A. Coles, O. A. Sayce, D. Le Souëf and others also discussed the paper.

3. By Messrs. S. A. Le Souëf and H. Bullen, entitled "Descriptions of Some New Mallophaga from Marsupials" (communicated by Mr. D. Le Souëf, C.M.Z.S.)

The authors described three species belonging to the genus Boopia, while for a fourth species found on wallabies a new genus, Latumcephalum, was founded.

NATURAL HISTORY NOTES.

Mr. H. E. Gatliff read some notes relating to some South African birds' eggs which he had collected in the Transvaal, and which he exhibited. Messrs. G. A. Keartland and R. Hall discussed some of the points mentioned.

The president, Mr. T. S. Hall, M.A., gave an interesting account of his visit to Tasmania to attend the meeting of the Australasian Association for the Advancement of Science. The meeting was a successful one, though the number of papers read, especially in biology, was much below the average. Members of the geological section made several short trips from Hobart, a large party went to Port Cygnet, and after the session closed nearly thirty members set out for the West Coast to see the scenery and inspect the mines. Some of the party were, however, content to stay at Wynyard to collect fossils at the Table Cape beds. The nature of the country through which the excursionists passed was briefly described, and the opposing shores of Tasmania and Victoria were compared.

Mr. G. Sweet, F.G.S., also made some interesting remarks on some of the geological observations made during the trip.

EXHIBITS.

1. By Mr. H. T. Tisdall.—Fruit of *Mandevillea suaveolens,* and drawings of—(1) a blossom ; (2) blossom partly dissected to show the pistil ; (3) blossom, sepals and petals removed ; (4) blossom, anthers also removed ; (5) blossom, section of ovary, showing the two separate carpels ; (6) two follicles of *M. sauveolens* attached at their tips ; also anthers and pistils preserved in formalin, in explanation of an unusual specimen grown by Mr. W. Scott.

2. By Mr. A. D. Hardy.—Petrified wood and a specimen of natural wood of supposed same genus for comparison, from Wando Vale, Victoria.

3. By Mr. H. Ernest Gatliff.—South African birds' eggs, including those of Frog-waders, Red Bishop-bird, Weaver-birds, and others ; beetle from Pretoria; two marine shells found in Boer farm-houses, Transvaal ; freshwater Mussel from Watervaal, Transvaal.

4. By Mr. R. Hall.—Male specimens of *Malurus dorsalis, Pachycephala falcata,* and *Myzomela pectoralis,* showing the development of the plumage.

5. By Mr. C. French, jun.—Longicorn beetle, *Uracanthus simulans,* breeding in *Aster ramulosus,* Mordialloc.

6. By Mr. J. A. Kershaw, F.E.S., for National Museum.—A large series of the shells of *Argonauta nodosa, A. argo, Nautilus pompilius,* &c. ; also specimens of the animals of same in their shells, preserved in spirits, in illustration of his paper.

7. By Mr. S. P. Townsend.—Frigate-bird, *Fregata aquila,* shot at Mornington by himself, and believed to be the second specimen of its kind secured in Port Phillip Bay. The specimen measured 6 ft. 4 in. across the wings.

8. By Messrs. C. French, jun., and H. T. Tisdall.—Insect galls on *Acacia pycnantha* and Eucalyptus, sp. ; also scale, *Lecanium oleæ,* on Native Musk, *Aster argophyllus.*

After the usual conversazione the meeting terminated.

AMONG THE BIRDS OF WESTERN AUSTRALIA.

(*Concluded from page* 168.)

By Robert Hall.

(*Read before the Field Naturalists' Club of Victoria,* 13*th Jan.*, 1902.)

Among the birds collected between Albany and Denmark were *Zosterops gouldi* (the first bird seen by the writer in W.A.); *Pseudogerygone culicivora,* a bird with a particularly sweet and "no-trouble-in-the-world" voice ; *Zonœginthus oculatus,* with nest and eggs ; *Malurus elegans,* male and female ; *Petrœca*

campbelli, in all its phases, together with nest and eggs; and *Strepera plumbea*, right in the heart of the forest.

Albany and its environments form a veritable "Garden of Eden," and the vegetable kingdom is too much in evidence for my present purpose. It is a botanists' country, rich in flowers, and especially so in the composites, hakeas, and grevilleas. Why such dry-flowered and leaved plants should be so abundant in what is actually a damp district needs further thought than I have been able to give it. Possibly they have encroached from the drier parts further north. I was delighted, ten minutes after being ashore for the first time, to see the Honey-eaters *Acanthorhynchus superciliosus* and *Zosterops gouldi* among them. By the rich appearance, and the difference between it and the Eastern flora, one quickly sees that the late Professor Tate had a good reason for calling this the Autochthonian sub-region. The birds, however, appear to lend him but meagre support, though the invertebrates may.

Leaving Albany by train for Katanning, some 150 miles north, I calculated upon getting into a drier district, with a certain portion of it under cultivation. Forty miles up the line Mt. Barker was passed, and in many respects it is similar to Albany and Tor Bay. It is just about the dividing line of the two climates, that of the dry to the north and of the damp air to the south. The timber now begins to shorten and become more sparse. Upon arrival at Katanning I found the most plentiful tree to be an acacia called the "jam-wood," on account of the likeness of its odour to the flavour of raspberry jam when the bark is cut away. Here I spent three days, which were particularly windy and wet. However, with the ardour of a member of this Club, I saw much of what can be seen under the circumstances. The "Qwoolyibruk," or Magpie Lark (*Grallina picata*, Lath.), was teaching its young how to call when it wanted company, as well as other signals. The Eastern birds of this species are vocally far in advance of the Western, which came quite as a surprise to me. The "Coolbardie,"* or Common Magpie, *Gymnorhina leuconota*, Gld.), was crowing like a barn-door rooster, without any true musical strain in its voice.

Birds in general in Western Australia do not talk much, yet it was the spring when I met them. The "Pūer," or Yellow-throated Minah, *Manorhina flavigula*, Gld., was at home in the district of Katanning, and the nature of the country also suited the "Dongrruck" (burr the r's), or Wattle-bird, *Acanthochœra carunculata*, Lath. Both were nesting. Some 15 miles west of the town is a creek that should prove very interesting. I was

* This would closely compare with Coolgardie. Bardie is a native name for a grub, and I suspect the name means a good grub-eater.

driven there by the kindness of Mr. R. K. Adam, and among others saw the Spotted Scrub-Wren, *Sericornis maculata*, Gld., and Western Thickhead, *Pachycephala occidentalis*, Rams. I secured the young of the former and eggs of the latter. But for the bad weather I should have much liked to have spent two days instead of two hours. My curiosity to follow up that creek is as strong now as it was then, as Mr. Adam, Resident Magistrate, well read in my face. Eggs of the Pallid Cuckoo, *Cuculus pallidus*, Lath., and Western Tit, *Acanthiza apicalis*, Gld., were added to my collection, after which I moved on to Perth. Staying here 36 hours gave me the opportunity to visit the Museum and the Zoological Gardens. The directors of each very kindly helped me to pass the time pleasantly and profitably.

While journeying towards Geraldton, some 300 miles by train north of Perth, I listened to a fellow-passenger who spoke of his personal experience with the Bustard, *Eupodotis australis*, Grey. Upon such salt plains as we are passing through, he said, turkeys are, as a rule, to be found. When the railway line was being advanced the engine driver use to shoot them at little more than 20 yards from the train. This occurred successfully for a time. The aborigines get their turkeys during the evening. When the sun is setting they crawl along the sun's rays so that turkeys cannot see them. Although sharp-sighted, the rays are too strong for their eyes. To shoot a turkey advance with the wind, so that when it sees you it will need to travel towards you, perhaps twenty yards, to get an impetus. Very much will depend upon the strength of the wind, as in the case of the Albatross, which will rise in three yards with a good breeze. In a letter dated and received subsequent to my visit I was shocked to hear of 84 Bustards having been shot by the people of one homestead during December, 1899. It is, much to our regret, too late for such an act in this State, but, being of such value as an insectivorous bird, our Western friends should provide against a recurrence of such slaughter, and not follow in the footsteps of our folly, for such it most certainly is to my mind.

The Raven, *Corone australis*, Gld., is said to eat corn and have a different note to the Eastern bird. It is short and feeble, sounding like "eyē," the accent making it very prolonged. There is also the ka′-ka′-ka′-ka′-kä, expressed in a clattering way.

Two miles inland from Geraldton I found a Kestrel, *Cerchneis cenchroides*, Vig. and Hors., had annexed a Raven's nest. No sooner had the Raven reared a brood, and taught them to finally leave their nest, than the Kestrel stepped in and laid three eggs in due course. No consideration seemed to be given to whether or not a second brood needed the nest (13/10/99). The Wren,

Malurus assimilis, North, had young abroad by the middle of October. A few days previous to this another Wren, *Malurus elegans*, Gld., had paired at Denmark in the extreme south.

The "Cherruck," or Pipit, *Anthus australis*, Vig. and Hors., I found near Geraldton to be almost uniform rufous, and in several parts of a deep shade of rufous; others were not so rufous, and some were greyish-brown.

The "Birringos," or Bee-eaters, *Merops ornatus*, had started to lay their eggs in the flat, grass-covered sand within nine yards of the Geraldton-Northampton railway line. One bowl, containing two eggs, had a tunnel horizontally bored 56 inches, the entrance to which was 2 inches by 1½ inches broad. There was no flooring to the bowl, and no insect food had yet been stored.

I met "Weeloos," or Curlews, *Burhinus grallarius*, Lath., in a lightly-timbered paddock. Being in pairs, they were shy, and probably were nesting. The Western Tit, *Acanthiza apicalis*, had its second brood, the first being 28th July and 3rd September, in two pairs. Very few water birds were met with, and I could only guess at two species of ducks upon the pools in the river beds. It is a thirsty country in this part for them. I heard of a duck, between Cue and Yalgo, that tried to alight on a contractor's train that was carrying a tank of water. The truck being behind the engine, the driver hurled coal at it. It kept darting towards the tank, and tried to land in it. After several efforts it was unkindly forced to leave.

Where I met water birds in great numbers was on the Coral Islands, adjacent to Geraldton, the most southerly coral islands in the southern hemisphere. I arrived on the jetty at midnight to embark, but learnt the cutter was at anchor and would not start before 3 a.m. Accordingly, I went to sleep, just as any waif would, in a quiet corner of the landing-stage, and woke up a little sooner than the arranged time. The tide and wind were earlier risers, and I felt somebody was becoming wet. With a fair breeze we sailed (15/10/99) across the 40 miles, arriving there just in time next evening to find the anchorage. Messrs. Broadhurst, M'Neil and Co. made me comfortable on the central group, and that evening I made my acquaintance with the greatest rookery of sea-birds on our continent. The night was calm and beautiful, but the air was filled with weird and wind-howling noises, enough to make the hair of the superstitious stand on end. The moaning was quite different to any other I have heard, and it took me a few minutes to form conclusions. It was the Allied Petrel, *Puffinus assimilis*. In the daylight an occasional moan only would be heard, and one might easily mistake it for the wail of a strange cat. The note in the noonday was also different from any sound I had previously heard, and I have numbered it among the strange experiences I enjoyed on that occasion.

Although I have visited several of the largest Petrel rookeries known, the sounds on this one were different to any of the others. The most southerly rookery of my experience (Kerguelen Island) was a quiet one, although millions of birds were there; the temperate one (Phillip Island, Vict.) was slightly turbulent; while this, probably the largest and most northerly south of the line, seemed to me to be the most lively one. Egg-laying had not started, and the only Petrel eggs I have found on the Abrolhos were those of the White-faced species, *Pelagodroma marina*, Lath. Young were also in the burrows, in addition to hard-set and fresh eggs. I saw the remains of several dead specimens of what appeared to be the Allied Petrel, *Puffinus assimilis*, Gld., on Pelsart Island. This I took to be the result of capture by cats, which certainly help to make the birds feel nervous. Lizards are enemies they have been used to, but cats and human beings have considerably reduced the bird life upon the group. It cannot now be described in the words of John Gilbert, and till cats and guano workers leave the islands this breeding haunt of the sea-fowl will present only a small proportion of the size of a century gone by. The consumption upon the islands by fishermen and others, though large, is not particularly injurious. They only take the eggs upon immediate laying; seldom more than twice from any rookery, and rarely that from more than two. The cats, at one time domesticated as far as the original stock was concerned, cause considerable trouble to that shy bird, the Noddy Tern, *Anous stolidus*. This species, gentle in its manner of identification, is not disposed to defend itself as the pugnacious Sooty Tern, *Anous fuliginosus*, does. As a natural consequence, the strongest help to depose the weakest in so far as they are not so disposed to breed as they once were in this locality. Like the case of the Gigantic Pigeon of the Pacific, the feline member is doing its work, though more slowly. The Noddy is the first Tern to breed on the Abrolhos. This season (28/10/99) their behaviour is something different to usual, as they have flocked in and formed a colony of, say, 2,000 birds, but only half a dozen have attempted to build nests. In a 2,000 colony of *Anous fuliginosa* I collected two eggs of *A. stolidus*, which were present in less than a dozen pairs.

For the first time I now met the Osprey, *Pandion leucocephalus*, Gld., in its home. I was particularly impressed with the difference between the impression made by the species in Great Britain and the sub-species in Australia. From Professor Newton's description, you will observe the Osprey is an elegant bird while on the wing above a lake situated in mountainous country. "The feat of carrying off an Osprey's egg is often difficult, and attended with some risk, but has more than once tempted the most daring of bird nesters. Apart from the dangerous situation,

not infrequently chosen by the birds for their eyry—a steep rock in a lovely lake, only to be reached after a long swim through chilly water, or the summit of a very tall tree—their fierceness in defence of their young and eggs is not to be despised. Men and boys have had their head gashed by the sharp claw of the angry parent when in a precarious position, rendering the enterprise formidable. But the prize is worthy of the danger."

My experience with a dozen nests was, for the most part, on absolutely flat coral *débris* and guano, slightly clothed with saltbush. There was no climbing to be done to get at the nests; I had simply to look into the nest and bend down to touch the eggs or young. In one case only I had to stand on tip-toe to see into the nest. It had been built of sticks, nearly 7 feet high, and in the form of a truncated cone. The owners soared or flapped overhead, and made a somewhat desolate kind of noise. They succeeded in impressing me only so far as differing very little from ordinary hawks. Certainly their nests were prodigious, and, being too large for any shrub to hold, the ground formed their resting-places. I stood in one and sat in another just to feel that I had been there, but the sanitary arrangements were not good enough to induce one to repeat the doubtful pleasure. The nests mostly contained young from about 10 days old to the fully-formed fledgling.

A flock of a bird that breeds in Siberia and winters in Australia, the Turnstone, *Arenaria interpres*, Linn., added life to the land uncovered by the tide. They chatted and chased one another as if petty jealousies were seriously amongst them. A silent Reef Heron, *Demiegretta sacra*, Gmelin, of the blue phase, quietly stood upon a jutting rock as if watching them. Turnstones fly very quickly—more rapidly than Snipe or Quail. Quail were numerous on the West Wallaby Island, but in the hurry of trying to find an Eagle's nest, *Haliaëtus leucogaster*, Gmelin, I lost the opportunity to identify the species. It appeared to be the Painted Quail, *Turnix varia*. I found single fresh eggs beneath the bushes, and perhaps enough to indicate the breeding season had commenced (25th October). On the evening of that day I rowed the dingy on to a patch of high dry coral *débris*, running upon which sounded like the noise one could imagine a goat in a porcelain shop would make. A few salt-bushes had grown upon it, and in the mesembryanthemum was delicately placed a neat nest of the White-eye or Silver-eye, *Zosterops gouldi*, B'parte. It was made of marine weed, and contained fresh eggs. Altogether it was a novelty, in keeping here, with everything ground-loving. A little Robin, *Petrœca goodenovii*, Vig. and Hors., had probably been blown from the mainland, for on Pelsart Island it looked disconsolate. Another stranger, the Rufous Song-Lark, *Cinclorhamphus rufescens*, Vig. and Hors.,

was more at home. A pair of Sacred Kingfishers, *Halcyon sanctus*, have recently appeared upon the island, and, I believe, had a nest among the planks at the end of the (years ago) deserted pier. It is the only spot on the islands that approaches the style of position of the usual nesting-place. There are plenty of lizards available, and if by force of circumstances they should have to take to fishing their opportunities will be ample.

Altogether I succeeded in finding upon the Houtman's Abrolhos Islands many species not previously recorded, and met with a rookery of the Caspian Tern, *Hydroprogne caspia*, Pall., finding some 13 nests, mostly with two eggs in each. I spent eight days cruising among the islands by means of special facilities granted me by the lessees, Messrs. Broadhurst, M'Neil and Co.

Returning to Geraldton, I practically concluded the tour, and returned in the s.s. *Kalgoorlie* with Mr. W. H. D. Le Souëf, a fellow-member of this Club, who had also been collecting in the Occident.

A VISIT TO THE FURNEAUX GROUP OF ISLANDS.

(*Read before the Field Naturalists' Club of Victoria*, 10*th Feb.*, 1902.)

By D. Le Souëf, C.M.Z.S.

During the latter end of November a party of four of us, consisting of Dr. C. Ryan, Mr. R. B. Ritchie, Mr. C. F. Belcher, and self, were enabled to visit the Furneaux Group of Islands, situated in Bass Strait, off the N.E. corner of Tasmania. We left Launceston in the s.s. *Star*, and in her were enabled to visit many of the various islands that are, as a rule, not often landed on. Our time was limited, therefore we did not visit as many as we would have wished, as some are a considerable distance apart, and also our landing on them much depended on the weather. During our trip we were for four days obliged to anchor under the lee of Preservation Island, on account of boisterous weather, and a westerly blow brings up a heavy sea on the side most of the islands are. Therefore in these trips one cannot always carry out their programme, as the weather has to be reckoned with, especially in a small boat.

This interesting group of islands, a map of which appeared in the *Victorian Naturalist*, vol. x. (1893-4), page 167, were first found in 1773, and named after their discoverer, Capt. Furneaux. Many of them are inhabited, the total number of the population being about 400. Flinders Island is by far the largest of the group, its west coast being mountainous, the highest point, Strzelecki Peak, being 2,500 feet in height. The east side of the island is low, flat, and sandy, and covered with short, thick scrub, but there are several settlements where the soil is of a better

description. Barren Island is also of a fair size, and also has granite ranges on it, the highest point being 2,300 feet, and although most of the higher land is rocky and more or less barren, yet many parts of the lower country are fertile, and at the time of our visit the flowering shrubs were very beautiful. Many of the smaller islands also have families living on them, and very well and healthy they all look, and it speaks well for the general health of the inhabitants when there is no doctor nearer than Launceston, over 60 miles away by sea. The inhabitants say that is why they are so well. Most of the smaller islands have sheep on, and also a few cattle. They do not seem to need much water. What they do get is generally brackish. Sheep can often do without any, as the succulent herbage affords sufficient moisture. The islands being so small, they always have a sea breeze, and do not get the extreme dryness or heat they would in the mainland.

The great mainstay, however, of the islanders is the Mutton-bird, or Short-tailed Petrel, *Puffinus tenuirostris*. These interesting birds nest on many of the smaller islands, such as Chappell Island, Little Dog Island, Little Green Island, Great Dog Island, Babel Island, and many others. The Tasmanian Government have prohibited the taking of the eggs of the bird, but allow the young birds to be taken for six weeks during the months of March and April. These birds, as is well known, come in from the sea to lay about 25th November, and deposit their one white egg at the bottom of a burrow about 4 feet in length, which is sometimes straight, other times not. Both birds take turns in sitting on the egg, the absent one being away at sea during the day feeding, returning just after sunset to its patient companion in the burrow, but occasionally both parent birds are found together in the burrow during the day. One egg is laid, but it is probable that if that is taken they lay another in the course of about ten days, but this has not yet been finally proved. We were enabled to visit a rookery just at dusk and to witness the wonderful incoming of the birds—a never-ending source of interest and wonder. How the birds as they fly swiftly in in the semi-darkness are able to pick out their right burrow from so many thousands of other burrows apparently almost identical is a matter of wonder, and so far it has completely puzzled us. It is a fascinating sight seeing so many thousands and thousands of birds whirling round and over one, but mostly flying low ; and then as the new arrivals enter their burrows they are welcomed by their mates with extraordinary kinds of sounds, which, coming from the earth, seem to make them all the more weird. The birds leave again at early dawn. Apparently their object in coming in during dusk is to escape the attacks of birds of prey, which during the day keep a fatherly eye on any stray birds they may find on the land, especially the Ravens.

These birds hunt over the islands, and any egg they find on the surface or in a shallow hole is soon disposed of, and any Mutton-bird or smaller Petrel they find near the surface and within view as it sits in its burrow they at once pounce upon, and, after a hard tussle, generally end in dragging the unfortunate Petrel out and eating it, consequently those birds that nest in deep holes fare best, and the tendency naturally is that those that make deep burrows survive, and those that make shallow ones run a great risk of not surviving, as flocks of Ravens, *Corone australis*, are to be found in all these islands. The young birds are taken in March and April, either out of their burrows, or caught when they are on their way to the sea. They are then plucked, cleaned, and salted down in casks, and every islander, and others also, have a busy time of it while the "birding," as they call it, lasts. It is estimated that about 600,000 young birds are yearly taken for food, yet, although such an enormous number are captured, they do not seem to diminish to any appreciable extent, which shows that a great number of young birds escape every year. Some rookeries are diminishing, but I think that is more due to cattle being allowed to wander over them and break in the holes, even when the birds are nesting, as it is apt to drive the birds to other places where they are less disturbed.

On some of the islands Tiger Snakes, *Hoplocephalus curtus*, are very plentiful, living in the burrows, but they do not seem to go into the same hole as a sitting bird, as I have noticed them cautiously going down a burrow, and when they found there was a bird at home, quickly withdrew; perhaps it was just as well, as the beak and claws of a Mutton-bird are sharp, and they know how to use them, and the eggs are too large for the snakes to swallow. The islanders also say they never find the birds and snakes in the same burrow, and it is easy to tell by the appearance of the hole whether a bird is using it or not. In walking among the long thick tussocky grass, where snakes are plentiful, one does not as a rule go fast, as the snakes frequently coil round the tussocks and lie on some small bare spot, and as one does not wish to come in contact with a snake if it can be helped, one is apt to proceed rather cautiously and nervously, even though wearing gaiters. Babel Island has a great number on. Those we saw on the various islands belonged to the Tiger species only. They are probably the most vicious and deadly snake we have. We were told various stories about them—how, for instance, one new-comer was sent to collect Mutton-birds' eggs, and he came back shortly after, saying he had got 9 eggs and 17 snakes, and that he had had enough of it; again, a lady assured us that when they first came to live on this island they started killing the snakes, and accounted for 900 the first year.

Penguins, *Eudyptula minor*, are very plentiful in places, and

when they could get no rocks to nest under they took possession of any Mutton-bird burrow they could near the beach, and when once in possession no Mutton-bird could turn them out, but if the hole was shallow they ran the risk of being attacked by ravens, which had the advantage, owing to their large, powerful beaks, and various skeletons of Penguins lying about bore grim testimony to their power. We found eggs in various stages of incubation, and only two in the clutch, but they soon get nest-stained. It often strikes a visitor to such scenes how unmusical and weird are the sounds uttered by the various sea birds, especially Penguins, Petrels, and Albatrosses, in contrast to those of land birds.

Cape Barren Geese, *Cereopsis novæ-hollandiæ*, were noticed on several of the islands, but we were too late for eggs, although one nest was found situated high up in a group of rocks in some tussocky grass, and from which the young had just been hatched, and we caught them not far from the nest, but liberated them again to go with their anxious mother, who kept flying round, uttering her call. The nest had some down in and dried grass. The parents seemed to take their little ones to feed near the water's edge when the tide was out. These birds do not increase very fast, as the eggs are taken or destroyed by the inhabitants of the islands on purpose to cheek any increase, as they find the birds take the grass they want for their cattle and sheep. Both the Pied and Sooty Oyster-catchers were very plentiful on the beaches. They were noisy birds. We noticed that the Pied variety, *Hæmatopus longirostris*, generally nested on the sand, frequently on the hummocks, whereas the Sooty, *H. unicolor*, nested on dead vegetation or seaweed, near the rocks, a little further inland. The eggs of the two birds are almost identical; that of the Sooty appeared as a rule slightly larger and darker, but not always.

We were enabled to visit Cat Island, but saw none of the dreaded breakers on our way there that the Field Naturalists' party came in contact with; we found the open sea perfectly smooth, and fully appreciated it, as our captain said he had seen the breakers in easterly weather as high as the mast of his ship breaking on the sand ridges, and we were quite content to take his word for it. On this island we landed, and paid a visit to the Gannet (*Sula serrator*) rookery, and a beautiful and interesting sight it was to see so many birds congregated together. The birds were evidently later nesting this year than when the members of the Field Naturalists' Club visited them in 1893, as they found young birds, whereas we only found fresh eggs, although we were there at a later time of the year. It was an interesting sight watching the birds and seeing the various antics they went through one towards another,

and also how vicious they were to one another, for if any neighbour came within reach of the sitting bird the latter considered it his or her duty to attack them, which it did to the best of its ability; as, for instance, we saw one bird in difficulties—one had hold of it by one of its legs, another hung on to one wing, and a third bird held it by its beak, and each bird was tugging away heartily, so the unfortunate captive had a bad time of it. They make blood flow freely in their attacks one on the other, and one bird we noticed had a deep wound on its back and was at the outskirts of the rookery, looking very sick and standing bunched-up by itself. About a score of Silver Gulls, *Larus novæ-hollandiæ*, espied it and set upon the poor bird, driving it away from its companions into the tussocky grass, where they probably soon despatched and ate it. It is astonishing how vicious sea birds, especially sea-gulls, are to one another, and any weakly or injured ones quickly get destroyed and eaten. According to my mind they are worse in this respect than any hawk. When we disturbed a Gannet so much that it had to take to flight we noticed that it first emptied the solid contents of its stomach alongside its egg, and being thus lightened flew away, and fish so disgorged were in all stages of digestion, and some of them weighed as much as four pounds; how the birds could have swallowed some of the fish I do not know. They must have a very elastic throat to get them down at all, and then can only do so head first; of course that part naturally gets digested first, and as that proceeds the tail end of the fish gets more into the stomach, as the fish, being often so long, can't get all down at once.

The view of Babel Island from the Gannet rookery was very fine, showing the masses of granite rock at its peak in bold relief, and with the glasses we were enabled to make out the eyrie of a White-bellied Sea Eagle near the summit; we were informed by our captain that at dusk, when the Mutton-birds came in, Babel Island was from this spot quite blotted out by the millions of birds that flew over and round it, and from our own experience we would say that it was so, although difficult to realize. At one point of Cat Island a number of Pacific Gulls, *Larus pacificus*, had their nests, forming a small colony, but we also found them building on most of the islands we visited. They made their nests generally among tussocky grass, or occasionally in mesembryanthemum, or pig-face, and it was a shallow open structure on the ground, and composed of a few tufts of coarse grass. The usual clutch of eggs was three, and very handsome eggs they are, of a rich brown colour. I am afraid we had not much compunction in taking a few of their eggs, as we knew what adepts they were in doing the same thing to their neighbours if they got half a chance, but they also largely feed on shell-fish, and they had their favourite rocks on which to break the shells. At such places

the ground was strewn with broken shells. These birds, as is well known, change the dark youthful plumage for the handsome adult one on reaching the age of three years. The dark beak of the young bird also gets brilliant yellow, commencing to change its colour from the upper portion first, so that towards the end of the third year the tip will be dark brown and the rest yellow, but it soon gets all the same hue.

On the neighbouring island, Storehouse, we noticed a colony of White-breasted Cormorants, *Phalacrocorax gouldi*, nesting, and getting into our boat we rowed across, but as we approached the birds flew away, and we found all the nests, which were composed of sticks and lined with seaweed, had either eggs or young in; three seemed a full clutch. The young had not got much down to boast of, and had a shining black skin, like so many little negroes. The nests were built on the bare granite rock, at varying distances apart. The whole place was white with excreta, and a decidedly fishy perfume pervaded the locality. Most of the eggs were hard-set. We have since been blamed for not destroying all the eggs and young, as Cormorants are so destructive to fish. Well, in the first place, we did not care about destroying the young and eggs of birds which had given us so much pleasure in watching them, and it certainly was a beautiful sight as they stood in numbers on the grey rock with their gleaming white breasts and black backs shining in the sun. Besides, there are plenty of fish in the sea for all. We certainly took a few eggs, but no young. A solitary Gannet had built her nest among the Cormorants, and was sitting on her egg quite undisturbed by her neighbours.

Among the tussocks of grass near the shore, and not far from the Cormorants, a large colony of Silver Gulls were nesting. They made their nests of dry grass, well hidden among the tussocks, but they had only just commenced to lay. I had found a single nest before on Preservation Island with three eggs in, situated in the shallow cleft of a granite rock, but it is not often that a pair of these birds will nest by themselves. They much prefer to do so in company. Several of the flocks we came across had not commenced nesting. Near the Gulls were a colony of Bass Straits Tern, *Sterna bergii*, and they circled screeching over our heads, but they had not commenced to lay.

Both the Hooded (*Ægialitis cucullatus*) and Red-capped (*Æ. ruficapilla*) Dottrels were noticed on the beaches of the various islands, and three nests with three eggs in each were found of the former, if nests they can be called, as they are simply shallow depressions scraped in the sand, with a few pieces of broken shell about them, and well above high-water mark, and in preference on the ridge of a sand spit, where a certain amount of seaweed gets blown up and more or less covered with fine sand. It is easy to pass by

these eggs and not detect them, as they are so like their surroundings, but the eggs of the Red-capped are more difficult to detect still. They nested on coarse, gravelly sand, just at or above high-water mark, where there is a small amount of seaweed thrown up, and they generally make their nest close to a piece, and, like the Hooded, seem to put a few pieces of broken shells about. On a small island called Rabbit Island we found the nesting burrows of the White-faced Storm Petrel, and the birds had not been long sitting. The entrances were often very small. We found also that a certain kind of crab made similar-sized holes, in which a pair lived. On many of the islands we found Caspian Terns, a pair generally to each island, and one nest with its two eggs was found and also one young one.

On all the islands Brown Quail, *Synœcus australis*, were fairly plentiful, and their nests and eggs found, situated in or under a tussock of grass, and generally well hidden. The eggs were the same size as those from Tasmania, and larger than those from Victoria. Only one pair of Reef Herons, *Demiegretta sacra*, were seen, and they apparently were not nesting, and on a small swamp on Barren Island three White-fronted Herons, *Notophoyx novæ-hollandiæ*. On the larger islands, where trees and shrubs were more abundant and afforded good cover, land birds were plentiful. They were identical with those found in Tasmania. Nests of several were discovered, but no fresh eggs.

The following is a list of the other birds seen and identified :—

Sea-Eagle, White-bellied ...	Haliaëtus leucogaster
Eagle, Wedge-tailed ...	Uroaëtus audax
Harrier	Circus gouldi
Hawk, Brown	Hieracidea berigora
Osprey	Pandion leucocephalus
Cockatoo, Black	Calyptorhynchus macrorhynchus
Raven	Corone australis
Shrike-Thrush, Whistling ...	Collyriocincla rectirostris
Crow-Shrike, Black ...	Strepera fuliginosa
Cuckoo-Shrike, Small-billed ...	Graucalus parvirostris
Robin, Flame-breasted ...	Petrœca phœnicea
Robin, Dusky	P. vittata
Blue Wren, Long-tailed ...	Malurus gouldi
Fan-tail, Dusky	Rhipidura diemenensis
Fly-catcher, Leaden ...	Myiagra rubecula
Fly-catcher, Satin	M. nitida
Reed-Warbler	Acrocephalus australis
Ground-Thrush, Large-billed	Geocichla macrorhyncha
Emu Wren	Stipiturus malachurus
Grass-bird	Megalurus gramineus
Scrub-Tit	Sericornis magna
Scrub-Wren, Brown ...	S. humilis
Field-Wren, Striated ...	Calamanthus fuliginosus

Chat, White-fronted ...	Ephthianura albifrons
Butcher-bird, Grey ...	Cracticus cinereus
Thickhead, Olive	Pachycephala olivacea
Thickhead, Grey-tailed ...	P. glaucura
White-eye	Zosterops cœrulescens
Honey-eater, Strong-billed ...	Melithreptus validirostris
Honey-eater, Black-headed ...	M. melanocephalus
Honey-eater, Tawny-crowned	Glycyphila fulvifrons
Honey-eater, Crescent ...	Meliornis australasiana
Honey-eater, White-bearded	M. novæ-hollandiæ
Wattle-bird, Yellow ...	Acanthochæra inauris
Wattle-bird, Brush ...	A. mellivora
Pardalote, Forty-spotted ...	Pardalotus quadragintus
Swallow	Hirundo neoxena
Martin, Fairy	Petrochelidon ariel
Finch, Fire-tailed	Zonæginthus bellus
Lorikeet, Musk	Glossopsittacus concinnus
Parrakeet, Green	Platycercus flaviventris
Lorikeet, Swift	Nanodes discolor
Pigeon, Bronze-wing ...	Phaps chalcoptera
Quail, Painted	Turnix varia
Coot	Fulica australis
Plover, Spur-wing	Lobivanellus lobatus
Tern, White-fronted ...	Sterna frontalis
Skua, Richardson's ...	Stercorarius crepidatus
Swan, Black	Chenopis atrata
Duck, Black	Anas superciliosa
Teal	Nettion castaneum
Shoveller	Spatula rhynchotis
Duck, Musk	Biziura lobata

Australian Anthropology.—After an absence of rather more than twelve months, the greater part of which was spent among the aboriginals of the northern interior of Australia, Professor Baldwin Spencer, F.R.S., and Mr. F. J. Gillen returned to Melbourne on 17th March. They were in excellent health, and were welcomed home by a number of gentlemen prominent in literary and scientific circles. The explorers have brought back a considerable amount of material, including phonograph and cinemetograph records, on which to base an extensive work on the myths, customs, &c., of the various tribes met with.

"The Emu."—The Australasian Ornithologists' Union is to be congratulated on the issue of the third number of *The Emu*, its official organ. This part, completing the first volume, fully maintains the high standard of the magazine, which we trust will attain the object aimed at, viz., "to popularize the study and protection of native birds," notwithstanding its almost prohibitive price.

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